GARMIN

GTN 725/750
TSO Installation Manual

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INFORMATION SUBJECT TO EXPORT CONTROL LAWS

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WARNING

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.

WARNING

Perchlorate Material – special handling may apply, See www.dtsc.ca.gov./hazardouswaste/perchlorate.

WARNING

This product contains a lithium battery that must be recycled or disposed of properly. Battery replacement and removal must be performed by professional services.

CAUTION

To avoid damage to the GTN, take precautions to prevent Electro-Static Discharge (ESD) when handling the GTN, connectors, fan, and associated wiring. ESD damage can be prevented by touching an object that is of the same electrical potential as the GTN before handling the GTN itself.

CAUTION

The GTN 725 and GTN 750 has a display that is coated with a special anti-reflective coating and is very sensitive to waxes and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the display using a microfiber cloth or with a clean, lint-free cloth and an eyeglass lens cleaner that is safe for anti-reflective coatings

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GTN 725/750 HARDWARE MOD LEVEL HISTORY

The following table identifies hardware modification (Mod) Levels for the GTN 725 and GTN 750. Mod Levels are listed with the associated service bulletin number, service bulletin date, and the purpose of the modification. The table is current at the time of publication of this manual (see date on front cover) and is subject to change without notice. Authorized Garmin Sales and Service Centers are encouraged to access the most up-to-date bulletin and advisory information on the Garmin Dealer Resource web site at www.garmin.com using their Garmin-provided user name and password.

Mod Level	Service Bulletin Number	Service Bulletin Date	Purpose Of Modification

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1 GENERAL DESCRIPTION

1.1 Introduction

This manual is applicable for units with main software version 2.00 or later. This manual describes the physical, mechanical, and electrical characteristics, as well as instructions and other conditions and limitations for installation and approval of the GTN units. Refer to Section 2, Limitations, for additional information and other considerations.

NOTE

Except where specifically noted, references made to GTN will equally apply to the GTN 725 and GTN 750.

Table 1-1. GTN Units

Model	Part Number	Color
GTN 725	011-02281-00	BLACK
GTN 750	011-02282-00	BLACK
	011-02282-50	GRAY

1.2 Equipment Description

The GTN 725 is a GPS/SBAS unit may be approved for IFR en route, terminal, non-precision, and precision approach operations. The GTN 725 meets the requirements of the TSO specified in Table 1-4.

The GTN 750 includes all the features of the GTN 725 and includes an airborne VHF communications transceiver and airborne VOR/LOC and glideslope receivers. The GTN 750 meets the requirements of the TSOs specified in Table 1-4.

CAUTION

The GTN has a display that is coated with a special anti-reflective coating that is very sensitive to waxes and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the display using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

CAUTION

The use of ground-based cellular telephones while aircraft are airborne is prohibited by FCC rules. Due to potential interference with onboard systems, the use of ground-based cell phones while the aircraft is on the ground is subject to FAA regulation 14 CFR §91.21. FCC regulation 47 CFR §22.925 prohibits airborne operation of ground-based cellular telephones installed in or carried aboard aircraft. Ground-based cellular telephones must not be operated while aircraft are off the ground. When any aircraft leaves the ground, all ground-based cellular telephones on board that aircraft must be turned off. Ground-based cell phones that are on, even in a monitoring state, can disrupt GPS/SBAS performance.

NOTE

All screen shots used in this document are current at the time of publication. Screen shots are intended to provide visual reference only. All information depicted in screen shots, including software file names, versions, and part numbers, is subject to change and may not be up to date.

1.3 Technical Specifications

1.3.1 Physical Characteristics

Characteristics	Specifications
Bezel Height	6.00 in. (152 mm)
Bezel Width	6.25 in. (159 mm)
Rack Height (Dimple-to-Dimple)	6.025 in. (153 mm)
Rack Width	6.300 in (160 mm)
Depth Behind Panel with Connectors (Measured from face of aircraft panel to rear of connector backshells)	11.25 in. (286 mm)
GTN 725 Weight (Unit only)	6.10 lbs (2.80 kg)
GTN 725 Weight (Installed with rack and connectors)	7.70 lbs (3.52 kg)
GTN 750 Weight (Unit only)	7.40 lbs (3.38 kg)
GTN 750 Weight (Installed with rack and connectors)	9.30 lbs (4.24 kg)

1.3.2 General Specifications

Characteristics	Specifications
Operating Temperature Range	-20°C to +55°C. For more details see Environmental Qualification Form on the Dealers Only page on www.garmin.com. See Appendix A for part numbers.
Humidity	95% non-condensing
Altitude Range	-1,500 ft to 50,000 ft
Input Voltage Range - All Units (Main Connector)	11 to 33 VDC
Input Voltage Range (COM Connector on GTN 750)	11 to 33 VDC
Input Voltage Range (NAV Connector on GTN 750)	11 to 33 VDC
GTN Current Draw	Refer to Table 1-2
Superflag Power Requirements	320 mA maximum per superflag output
Environmental Testing	See Environmental Qualification Form on the Dealers Only page on www.garmin.com. See Appendix A for part numbers.

The display on the GTN is a sunlight readable LCD display.

Characteristics	Specifications
Display Size	6.9 inch diagonal
Active Area	4.46 inches (W) x 5.27 inches (H)
Resolution	600 x 708 pixels
Viewing Angle	Left: 45° Right: 35° Up: 10° Down: 30°

1.3.3 GPS/SBAS Specifications

Characteristics	Specifications
Number Of Channels	15 (12 GPS and 3 SBAS)
Frequency	1575.42 MHz L1, C/A code
Sensitivity (Acquisition, No Interference)	-134.5 dBm GPS -135.5 dBm WAAS
Sensitivity (Drop Lock)	-144 dBm
Dynamic Range	> 20 dB
Lat/Lon Position Accuracy	<1.25 meter RMS horizontal, <2 meter vertical, with WAAS
Velocity	1000 knots maximum (above 60,000 ft)
TTFF (Time To First Fix)	1:45 min. typical with current almanac, position, and time
Reacquisition	10 seconds typical
Position Update Interval	0.2 sec (5 Hz)
1 PPS (Pulse Per Second)	±275 Nsec of UTC second
Datum	WGS-84
SATCOM Compatibility	SATCOM compatibility is dependent upon antenna selection.
Antenna Power Supply	35 mA typical, 40 mA max at 4.7 VDC

1.3.4 COM Specifications (GTN 750 Only)

1.3.4.1 COM Transmitter Specifications

Characteristics	Specifications
Classes	3,4,5,6
Microphone Input	Two inputs, standard carbon or dynamic mic with integrated preamp providing minimum 70 mVRMS into 1000Ω load
Modulation Capability	85% with 100 to 1000 mVRMS microphone input at 1000 Hz
Modulation	AM Double sided, Emission Designator 6K00A3E
Frequency Range	118.000 to 136.975 MHz, 25 kHz and 8.33 kHz channel spacing
Frequency Tolerance	+/-2ppm from -40°C to +70°C
Output Power	10 Watt Mode: 10 watts minimum 16 Watt Mode: 16 watts minimum
Duty Cycle	10W: 100% 16W: Recommended 25% (5 seconds on/15 seconds off, 15 seconds on/45 seconds off, etc.)
Carrier Noise Level	At least 35 dB (SNR).
Stuck Mic Time-Out	30 seconds time-out, reverts to receive
Demodulated Audio Distortion	Less than 5% distortion when the transmitter is at 85% modulation at 350 to 2500 Hz
Sidetone	1.4 Vrms into a 500Ω load

1.3.4.2 COM Receiver Specifications

Characteristics	Specifications
Classes	D and E
Frequency Range	118.000 to 136.975 MHz, 25 kHz and 8.33 kHz channel spacing
Headset Audio Output	100 mW minimum into a 500Ω load
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz.
Audio Distortion	Less than 5% at rated output power
AGC Characteristics	Less than 3 dB of variation in the audio output from -93 to -13 dBm (power absorbed by a 50Ω load)
Sensitivity	SINAD on all channels is greater than 6 dB when the RF level is 2 uV (hard) or -107 dBm (power absorbed by a 50Ω load) modulated 30% at 1000 Hz at rated audio output power
Squelch	Automatic squelch with manual override
Selectivity	6 dB BW is greater than ± 7 kHz for 25 kHz channeling. 60 dB BW is less than ±22 kHz for 25 kHz channeling. 6 dB BW is greater than ±3.5 kHz for 8.33 kHz channeling. 60 dB BW is less than ±7.37 kHz for 8.33 kHz channeling.

1.3.5 VOR Specifications (GTN 750 Only)

Characteristics	Specifications
Receiver Audio Sensitivity	At -103.5 dBm (S+N)/N is not less than 6 dB.
Course Deviation Sensitivity	-103.5 dBm or less for 60% of standard deflection.
Flag	The VOR Course Deviation Flag is flagged when: • the level of a standard VOR deviation signal produces less than a 50% of standard deflection. • RF signals are absent. • The 9960 Hz modulation is absent. • Either one of the two 30 Hz modulations are absent.
AGC Characteristics	From -99 dBm to -13 dBm input of a Standard VOR Audio Test Signal, audio output level does not vary more than 3 dB.
Spurious Response	Greater than 60 dB.
VOR OBS Bearing Accuracy	The bearing information as presented to the pilot does not have an error in excess of 2.7° as specified by RTCA DO-196 and EuroCAE ED-22B.
Audio Output	A minimum 100 mW into a 500Ω load.
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz. In voice mode, an IDENT tone of 1020 Hz Ident Tone is attenuated at least 20 dB down.
Audio Distortion	The distortion in the receiver audio output does not exceed 10% at all levels up to 100 mW.

1.3.6 LOC Specifications (GTN 750 Only)

Characteristics	Specifications
Receiver Audio Sensitivity	At -103.5 dBm (S+N)/N is not less than 6 dB.
Course Deviation Sensitivity	At -103.5 dBm, deviation output is not to be less than 60% of standard deflection when a LOC deviation test signal is applied.
Flag	The VOR/LOC Course Deviation Flag is flagged when: • the level of a standard VOR deviation test signal produces 50% or less of standard deflection of the deviation indicator. • 150 Hz modulation is absent. • 90 Hz modulation is absent. • 90 Hz and 150 Hz modulation are both absent. • RF signals are absent.
AGC Characteristics	From –99 dBm and –13 dBm input of a Standard VOR Audio Test Signal, audio output level does not vary more than 3 dB.
Selectivity	6 dB BW is greater than 9 kHz. 69 dB BW is less than 36 kHz.
Standard Deflection	With a standard deflection 'FLY LEFT' condition (90 Hz dominant), the output is +90 mV ± 9 mV. With a standard deflection 'FLY RIGHT' condition (150 Hz dominant), the output is -90 mV ± 9 mV.
Spurious Response	Greater than 60 dB.
Centering Accuracy	0 ±0.01023 ddm or 0 ±9.9 mV.
Audio Output	A minimum 100 mW into a 500Ω load.
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz. In voice mode, an IDENT tone of 1020 Hz is attenuated at least 20 dB.
Audio Distortion	The distortion in the receiver audio output does not exceed 10% at all levels up to 100 mW.

1.3.7 Glideslope Specifications (GTN 750 Only)

Characteristics	Specifications
Sensitivity	-87 dBm or less for 60% of standard deflection.
Centering Accuracy	0 ±0.01183 ddm or 0 ±10.14 mV
Selectivity	The course deviation is 0 ddm ± .0091 ddm when using the Glideslope Centering Test Signal as the RF frequency is varied ±17 kHz from the assigned channel. At frequencies displaced by ±132 kHz or greater, the input signal is at least 60 dB down.
Standard Deflection	With a standard deflection 'FLY DOWN' condition (90 Hz dominant), the output is -78 mV ±7.8 mV. With a standard deflection 'FLY UP' condition (150 Hz dominant), the output is +78 mV ±7.8 mV.
Flag	The unit flags when: • the level of a standard VOR deviation test signal produces 50% or less of standard deflection of the deviation indicator. • 150 Hz modulation is absent. • 90 Hz modulation is absent. • 90 Hz and 150 Hz modulations are both absent. • RF signals are absent.

Table 1-2. GTN Current Specifications

LRU	14 Volt Current Draw		28 Volt Current Draw	
	Typical	Maximum	Typical	Maximum
GTN 725				
Main Connector	2.4 A [1]	3.4 A [2]	1.2 A [1]	1.8 A [2]
GTN 750				
Main Connector	2.4 A [1]	3.4 A [2]	1.2 A [1]	1.8 A [2]
COM Connector	0.45 A	5.66 A (16W COM) 4.02 A (10W COM)	0.21 A	2.33 A (16W COM) 1.76 A (10W COM)
NAV Connector	0.60 A	1.16A [2]	0.30 A	0.58 A [2]

[1] The specified current draw is with the display backlight set to 100% and the fan operating at low speed. If the superflags are connected, their current draw must be added in addition to the specified current.

[2] The specified current draw does not include the superflags. If connected, their current draw must be added to the specified current. The superflags will supply up to 320 ma each regardless of the input voltage.

1.3.8 GPS Antenna Requirements

Antenna performance is critical to the GPS/SBAS operation. The antennas listed in Table 1-3 provide acceptable performance with the GTNs.

Table 1-3. Approved GPS/SBAS Antennas

Model/Description	Conn Type	Mfr	Part Number	Garmin Order Number
GA 35, GPS/WAAS [1]	TNC	Garmin	013-00235-( )	013-00235-( )
		Aero Antenna	AT575-93G( )-TNCF-000-RG-27-NM	
GA 36, GPS/WAAS	TNC	Garmin	013-00244-( )	013-00244-( )
		Aero Antenna	AT575-126G( )-TNCF-000-RG-27-NM	
GA 37, GPS/WAAS/XM	TNC	Garmin	013-00245-( )	013-00245-( )
		Aero Antenna	AT2300-126G( )-TNCF-000-RG-27-NM	
A33W, WAAS Antenna	TNC	Garmin	013-00261-( )	013-00261-( )
		Aero Antenna	AT575-332G( )- TNCF-000-RG-27-NM	
GPS/VHF Antenna	TNC/BNC [2]	Comant	CI-2580-200	N/A
GPS/VHF Antenna	TNC/BNC [2]	Comant	CI-2728-200	N/A
GPS/XM/VHF Antenna	TNC/TNC/BNC [3]	Comant	CI-2580-410	N/A
GPS/XM/VHF Antenna	TNC/TNC/BNC [3]	Comant	CI-2728-410	N/A
GPS/WAAS Antenna	TNC	Comant	CI-428-200	N/A
GPS/XM Antenna	TNC/TNC	Comant	CI-428-410	N/A

[1] Same mounting hole pattern as GA 56, but GA 35 antenna has a physically larger footprint.

[2] The antenna connector is a TNC type. The VHF connector is a BNC type.

[3] The antenna connector is a TNC type. The XM connector is a TNC type. The VHF connector is a BNC type.

1.4 License Requirements

The Telecommunications Act of 1996, effective February 8, 1996, provides the FCC discretion to eliminate radio station license requirements for aircraft and ships. The GTN 750 installations must comply with current transmitter licensing requirements. In the US, to find out the specific details on whether a particular installation is exempt from licensing, please visit the FCC web site http://wireless.fcc.gov/aviation. If an aircraft license is required, make application for a license on FCC form 404, Application for Aircraft Radio Station License. The FCC also has a fax-on-demand service to provide forms by fax. Outside the US, contact the responsible telecommunication authority. The GTN 725 and 750 owner accepts all responsibility for obtaining the proper licensing before using the transceiver. The maximum transmitting power, modulation identification, and frequency band information may be required for licensing and are detailed in Section 1.4.4.

CAUTION

The VHF transmitter in this equipment is guaranteed to meet Federal Communications Commission acceptance over the operating temperature range. Modifications not expressly approved by Garmin could invalidate the license and make it unlawful to operate the equipment.

1.5 Regulatory Compliance

1.5.1 TSO Authorization and Advisory Circular References

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only in compliance with 14 CFR part 43 or the applicable airworthiness requirements.

All GTN unit functions are design approved under the TSO. Unauthorized changes or modifications to any GTN unit product may void the compliance to required regulations and authorization for continued equipment usage.

Table 1-4. TSO Authorization

[1] [2]		Function	TSO/ETSO/SAE/ RTCA/EUROCAE	Class/ Type	Applicable SW P/Ns	Applicable CLD P/Ns
GTN 725	GTN 750					
	C	ILS Glideslope Receiving Equipment	TSO-C34e DO-192		006-B0082-11 through -1( ) 006-B1026-01 through -0( )	006-C0124-00 through 006-C0124-0( ) 006-C0134-22 through 006-C0134-2( ) 006-C0135-22 through 006-C0135-2( )
	C	ILS Localizer Receiving Equipment	TSO-C36e DO-195	A	006-B0082-11 through -1( ) 006-B1026-01 through -0( )	
	C	VOR Receiving Equipment	TSO-C40c DO-196		006-B0082-11 through -1( ) 006-B1026-01 through -0( )	
I	I	Airborne ATC Transponder Equipment	TSO-C74d DO-144A	A	006-B1026-01 through -0( )	
I	I	Airborne Passive Thunderstorm Detection Equipment	TSO-C110a DO-191		006-B1026-01 through -0( )	
I	I	Air Traffic Control Radar Beacon System/Mode Select ATCRABS/Mode S	TSO-C112c DO-181D		006-B1026-01 through -0( )	
C	C	Multipurpose Electronic Displays	TSO-C113 AS 8034	1	006-B1026-01 through -0( )	
I	I	Traffic Collision Avoidance System (TCAS) Airborne Equipment	TSO-C118 DO-197		006-B1026-01 through -0( )	
	C	Equipment that Prevents Blocked Channels in 2-way Radio Communications due to Unintentional Transmissions	TSO-C128a DO-207		006-B1026-01 through -0( ) 006-B1061-02 through -0( )	
I	I	Aircraft Audio Systems and Equipment	TSO-C139 DO-214		006-B1026-01 through -0( )	
C	C	Stand-Alone Airborne Navigation Equipment using the GPS Augmented by the Satellite Based Augmentation System	TSO-C146c DO-229D	3	006-B0339-10 through -1( ) 006-B1026-01 through -0( )	
I	I	Traffic Advisory System (TAS) Airborne Equipment	TSO-C147 DO-197A	A	006-B1026-01 through -0( )	
C	C	Terrain Awareness Warning Systems (TAWS)	TSO-C151b	B	006-B1026-01 through -0( )	
C	C	Electronic Map Display Equipment for Graphical Depiction of Aircraft Position	TSO-C165 DO-257A		006-B1026-01 through -0( )	
	C	VHF Radio Communications Transceiver Equipment Operating with Radio Frequency Range 117.975 to 137.000 MHz	TSO-C169a DO-186B		006-B1061-02 through -0( ) 006-B1026-01 through -0( )	

[1] **C** – Complete TSO

[2] **I** – Incomplete TSO - The incomplete TSOs/ETSOs are for an incomplete system. The GTN must be interfaced to units with applicable TSO/ETSO authorizations to be a complete TSO/ETSO system.

1.5.2 Non-TSO Functions

Table 1-5. Non-TSO Functions

Function	Applicable SW P/N	Applicable CLD P/Ns
XM Satellite Radio Weather Display The GTN 725/750 displays weather products when connected to Garmin GDL 69 Series XM Radio Receiver	006-B1026-01 through -0( )	006-C0134-22 through -2( )
XM Satellite Radio Audio Entertainment The GTN 725/750 displays channel information and control audio output from Garmin GDL 69 Series	006-B1026-01 through -0( )	006-C0134-22 through -2( )
Traffic Display/Control (TIS) The GTN 725/750 requests and displays traffic data from GTX Mode S Transponder.	006-B1026-01 through -0( )	006-C0134-22 through -2( )

Table 1-6. System Functions

System Function	DO-178B Level
Operating System	B
Touchscreen Display and Control	B
GPS/SBAS Navigation Information and CDI/VDI Output	B
VHF DME Navigation Information and VHF CDI/VDI Output	B
VHF Communication	B
Display of VOR/LOC/Glideslope information	B
Roll Steering Command Output	C
TAWS (Class B) Functionality	C
Display of terrain, moving map, and charts	B
Display of marker beacon, flight planning information, ADS-B traffic, data from passive lightning detection equipment, TIS/TAS/TCAS I data, XM weather and audio entertainment data	B
Processing of TAS and TCAS I and remote audio panel data	C
Processing of passive lightning detection, TIS, marker beacon, and XM weather and audio data	D
Transponder communication	C
HSDB Data Forwarding	B

1.5.3 TSO Deviations

TSO	Deviation
TSO-C34e	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
TSO-C36e	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
TSO-C40c	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
TSO-C74d	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
TSO-C110a	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
	4. Garmin was granted a deviation from the TSO not to mark the computer software level(s) on the unit.
TSO-C112c	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
TSO-C113	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
	4. Garmin was granted a deviation from the TSO not to mark the computer software level(s) on the unit.

TSO	Deviation
TSO-C118	1. Garmin was granted a deviation from the TSO not to mark the computer software level(s) on the unit.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-197A instead of RTCA/DO-197 as the Minimum Operational Performance Standards.
	3. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	4. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	5. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
TSO-C128a	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and statement on the unit's nameplate label, "TSO-C146c Class 3, See IM for Add'l Appliance Approvals", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation, Environmental Categories, Date of Manufacture, Weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.
TSO-C139	1. Garmin was granted a deviation from the TSO not to furnish each person receiving a GTN 725/750 copies of the data in Paragraph 5.l of the TSO.
	2. Garmin was granted a deviation from the TSO not to furnish each person receiving a GTN 725/750 copies of the data in Paragraph 5.l, 5.m, 5.n of the TSO, if the equipment performs functions beyond those in paragraph 3 and paragraph 3.a.
	3. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	4. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
TSO-C146c	1. Garmin was granted a deviation from RTCA/DO-229D to use a 10 degree vertical viewing angle below the lower display edge.
	2. Garmin was granted a deviation from RTCA/DO-229D to use GPS antennas that meet Garmin minimum performance specifications.
	3. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	4. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
TSO-C147	1. Garmin was granted a deviation from the TSO not to furnish each person receiving a unit copies of the data in paragraphs 3(a)(10) through (12) of the TSO.
	2. Garmin was granted a deviation from the TSO not to display a visual "Traffic" annunciation for the duration of the traffic alert.
	3. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	4. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
	5. Garmin was granted a deviation from the TSO to use RTCA/DO-178B instead of earlier versions of RTCA/DO-178 to demonstrate compliance for the verification and validation of the computer software.

TSO	Deviation
TSO-C151b	1. Garmin was granted a deviation from the TSO Section 5.c(2) not to furnish each person receiving a unit copies of the data in paragraphs 5.a(11) through (13) of the TSO.
	2. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
TSO-C165	1. Garmin was granted a deviation from the TSO Section 5.c(2) not to furnish each person receiving a unit copies of the data in paragraphs 5.a(11) through (13) of the TSO.
	2. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	3. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.
TSO-C169a	1. Garmin was granted a deviation from the TSO to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
	2. Garmin was granted a deviation from the TSO to use RTCA/DO-160F instead of earlier versions of RTCA/DO-160 as the standard for Environmental Conditions and Test Procedures of Airborne Equipment.

1.5.4 FCC Grant of Equipment Authorization

Model	FCC ID	IC ID
GTN 750	IPH-01594	1312A-01594

1.5.5 AFM/AFMS/POH Considerations

The following information may be used as guidance in developing an approved AFM, AFMS, and/or POH when not installed in accordance with an STC provided the installation is:

- comprised of one or more TSO-C146c Class 3 approved Garmin GTN 725/750 Display Unit(s), one or more Garmin approved GPS/SBAS antenna(s) (see Table 1-3), and GPS software version 4.0 or later approved version,
- in accordance with the guidance in AC 20-138A and the installation instructions in this manual.

GARMIN GNSS (GPS/SBAS) NAVIGATION SYSTEM EQUIPMENT APPROVALS

For FAA approved installations in U.S. registered aircraft:

The Garmin GNSS navigation system is a GPS system with a Satellite Based Augmentation System (SBAS), comprised of one or more Garmin TSO-C146c GTN 725/750 navigator(s) and one or more Garmin approved GPS/SBAS antenna(s). The Garmin GNSS navigation system should be installed in accordance with AC 20-138A.

The Garmin GNSS navigation system, as installed in this aircraft, and when installed in accordance with the requirements of AC 20-138A, has airworthiness approval for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, and non-precision approach operations (including those approaches titled "GPS", "or GPS", and "RNAV (GPS)" approaches). The Garmin GNSS navigation system is approved for approach procedures with vertical guidance including "LPV" and "LNAV/VNAV", within the U.S. National Airspace System.

The Garmin GNSS navigation system as installed in this aircraft, complies with the equipment requirements of AC 90-105 and meets the equipment performance and functional requirements to conduct

RNP terminal departure and arrival procedures and RNP approach procedures without RF (radius to fix) legs. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

The Garmin GNSS navigation system as installed in this aircraft complies with the equipment requirements of AC 90-100A for RNAV 2 and RNAV 1 operations. In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 and RNAV 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

Applicable to dual installations consisting of two GTNs: The Garmin GNSS navigation system, as installed in this aircraft, has been found to comply with the requirements for GPS Class II oceanic and remote navigation (RNP-10) without time limitations in accordance with AC 20-138A and FAA Order 8400.12A. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. This does not constitute an operational approval.

Applicable to dual installations consisting of two GTNs: The Garmin GNSS navigation system, as installed in this aircraft, has been found to comply with the navigation requirements for GPS Class II oceanic and remote navigation (RNP-4) in accordance with AC 20-138A and FAA Order 8400.33. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. Additional equipment may be required to obtain operational approval to utilize RNP-4 performance. This does not constitute an operational approval.

The Garmin GNSS navigation system, as installed in this aircraft, complies with the accuracy, integrity, and continuity of function, and contains the minimum system functions required for P-RNAV operations in accordance with JAA Administrative & Guidance Material Section One: General Part 3: Temporary Guidance Leaflets, Leaflet No 10 (JAA TGL-10 Rev 1). The GNSS navigation system has [one or more] TSO-C146c Class 3 approved Garmin GTN 725/750 Navigation Systems. The Garmin GNSS navigation system as installed in this aircraft complies with the equipment requirements for P-RNAV and B-RNAV/RNAV 5 operations in accordance with AC 90-96A CHG 1 and JAA TGL-10 Rev 1. This does not constitute an operational approval.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153 for database integrity, quality, and database management practices for the Navigation database. Flight crew and operators can view the LOA status at FlyGarmin.com then select "Type 2 LOA Status." Navigation information is referenced to WGS-84 reference system.

For FAA approved installations in non- U.S. registered aircraft:

For installations outside the United States of America or in non-U.S. registered aircraft, installations should comply with applicable regulations and guidance of the cognizant Civil Aviation Authority.

Note that for some types of aircraft operation and for operation in non-U.S. airspace, separate operational approval(s) may be required in addition to equipment installation and airworthiness approval.

GARMIN GNSS (GPS/SBAS) NAVIGATION SYSTEM LIMITATIONS

The pilot must confirm at system initialization that the Navigation database is current. Navigation database is expected to be current for the duration of the flight. If the AIRAC cycle will change during flight, the pilot must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

GPS/SBAS based IFR en route, oceanic, and terminal navigation is prohibited unless the pilot verifies and uses a valid, compatible, and current Navigation database or verifies each waypoint for accuracy by reference to current approved data.

Discrepancies that invalidate a procedure must be reported to Garmin International. The affected procedure is prohibited from being flown using data from the Navigation database until a new Navigation

database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com then select "Aviation Data Error Report." Flight crew and operators can view Navigation database alerts at FlyGarmin.com then select "NavData Alerts."

For flight planning purposes, in areas where SBAS coverage is not available, the pilot must check RAIM availability. Within the United States, RAIM availability can be determined using the Garmin WFDE Prediction program, Garmin part number 006-A0154-05 (included in GTN trainer) software version 3.00 or later approved version with Garmin approved antennas or the FAA's en route and terminal RAIM prediction website: www.raimprediction.net, or by contacting a Flight Service Station. Within Europe, RAIM availability can be determined using the Garmin WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at http://augur.ecacnav.com/augur/app/home. For other areas, use the Garmin WFDE Prediction program. This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight. The route planning and WFDE prediction program may be downloaded from the Garmin website on the internet. For information on using the WFDE Prediction Program, refer to Garmin WAAS FDE Prediction Program, part number 190-00643-01, 'WFDE Prediction Program Instructions'.

For flight planning purposes, operations within the U.S. National Airspace System on RNP and RNAV procedures when SBAS signals are not available, the availability of GPS RAIM shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended route of flight, the flight should be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

For flight planning purposes for operations within European B-RNAV/RNAV 5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight should be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

Applicable to dual installations consisting of two GTNs: For flight planning purposes, operations where the route requires Class II navigation the aircraft's operator or pilot-in-command must use the Garmin WFDE Prediction program to demonstrate that there are no outages on the specified route that would prevent the Garmin GNSS navigation system from providing GPS Class II navigation in oceanic and remote areas of operation that requires (RNP-10 or RNP-4) capability. If the Garmin WFDE Prediction program indicates fault exclusion (FDE) availability will exceed 34 minutes in accordance with FAA Order 8400.12A for RNP-10 requirements, or 25 minutes in accordance with FAA Order 8400.33 for RNP-4 requirements, then the operation must be rescheduled when FDE is available.

Both Garmin GPS navigation receivers must be operating and providing GPS navigation guidance for operations requiring RNP-4 performance.

Applicable to dual installations consisting of two GTNs: North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace operations per AC 91-49 and AC 120-33 require both GPS/SBAS receivers to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor. Each display computes an independent navigation solution based on its GPS sensor.

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs) and Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), and en route RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually. Selecting and inserting individual named fixes from the database is permitted, provided all fixes along the published route to be flown are inserted. Manual entry of waypoints using latitude/longitude or place/bearing is prohibited.

"GPS", "or GPS", and "RNAV (GPS)" instrument approaches using the Garmin navigation system are prohibited unless the pilot verifies and uses the current Navigation database. GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the Navigation database.

Not all published Instrument Approach Procedures (IAP) are in the Navigation database. Pilots planning on flying an RNAV instrument approach must ensure that the Navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the Navigation database into the Garmin GNSS navigations system flight plan by its name.

IFR non-precision approach approval using the GPS/SBAS sensor is limited to published approaches within the U.S. National Airspace System. Approaches to airports in other airspace are not approved unless authorized by the appropriate governing authority.

The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart. Use of the Garmin GPS/SBAS receivers to provide navigation guidance during the final approach segment of an ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for "or GPS" navigation is prohibited.

Applicable to installations with GTN 750 Units: When using the Garmin VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI of the pilot flying.

Navigation information is referenced to WGS-84 reference system, and should only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conform to WGS-84 or equivalent.

1.6 GTN Databases

The GTN utilizes various databases. With the exception of the Navigation, Basemap, SafeTaxi, and Obstacle databases which reside internal to the GTN, all databases are stored in a single SD memory card that is inserted into the vertical slot on the left side of the GTN. The following describes each database and how the databases are updated.

Garmin requests that the flight crew report any observed discrepancies related to database information. These discrepancies could come in the form of an incorrect procedure; incorrectly identified terrain, obstacles and fixes; or any other displayed item used for navigation or communication in the air or on the ground. Go to FlyGarmin.com and select "Aviation Data Error Report."

CAUTION

The databases on the Supplemental Data Card are locked to specific GTN installations. The first time the Supplemental Data Card is inserted into a GTN it becomes "locked" to that particular GTN and will not work in other installations.

1.6.1 Basemap Database

The basemap provides ground-based references such as roads and bodies of water. The database is stored in the GTN internal memory. The basemap does not have a scheduled update cycle and as such does not have an expiration date. The basemap database is updated very infrequently. Should this database need to be updated in the future, Garmin will provide details on how to load the updated data into the GTN.

1.6.2 Navigation Database

The Jeppesen Navigation Database provides the GTN with the required information for displaying flight plan information.

The GTN utilizes a database stored on an SD memory data card for easy updating and replacement. The navigation database may be updated by inserting an updated navigation database update card into the vertical SD card slot on the left side of the GTN. The actual database is downloaded into the unit, so the card can be removed after the update. Each card will only update one system. Alternately, the navigation database may be updated by copying the database to the Garmin-supplied Supplemental Data card. It will be downloaded into the GTN on first use, and the file can be left on the Supplemental Data card until the next update cycle.

The navigation database on the GTN database card is generated from current Jeppesen Sanderson data and converted to a format that is used by the GTN. The data conversion process is performed using software that is developed and maintained under Garmin configuration management according to RTCA/DO-200A, Standards for Processing Aeronautical Data. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 800-800-1020 or www.fly.garmin.com for more information and instructions.

1.6.3 FliteCharts® Database

FliteCharts resemble the paper version of AeroNav Services (formerly named National Aeronautical Charting Office) terminal procedures charts. The charts are displayed with high-resolution and in color for applicable charts. FliteCharts database subscription is available from Garmin. When viewing these charts on the GTN, the aircraft position is not depicted on the chart. The FliteCharts database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 800-800-1020 or www.fly.garmin.com for more information and instructions.

1.6.4 ChartView™ Database

ChartView resembles the paper version of Jeppesen terminal procedures charts. The charts are displayed in full color with high-resolution. The GTN depiction shows the aircraft position on the moving map in the plan view of approach charts and on airport diagrams. The ChartView database is stored on an SD memory card that remains in the GTN for normal operation. The ChartView database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their ChartView data by purchasing database subscription updates from Jeppesen Sanderson. The database card is programmed using an SD card reader and Jeppesen-provided software. Contact Jeppesen at 800-621-5377 or www.jeppesen.com for more information and instructions.

1.6.5 SafeTaxi® Database

SafeTaxi diagrams provide detailed taxiway, runway, and ramp information at more than 900 airports in the United States. The SafeTaxi database is stored internally in the GTN for normal operation. The SafeTaxi database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 800-800-1020 or www.fly.garmin.com for more information and instructions.

1.6.6 Terrain Database

The Terrain database is used to provide basic terrain awareness functionality. The Terrain database is also used to provide TAWS alerts to the pilot (with TAWS software only). The Terrain database is available from Garmin for updating as needed. The terrain database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card in the vertical card slot on the left side of the GTN. The Terrain database can be downloaded via the internet and the card can be programmed using an SD card reader. Contact Garmin at 800-800-1020 or www.fly.garmin.com for more information or instructions.

1.6.7 Obstacle Database

The Obstacle database provides identification of known obstacles greater than 200 feet AGL. This database is also used with Terrain awareness and TAWS functionality. The Obstacle database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. The Obstacle database can be downloaded via the internet and the card programmed using an SD card reader. Contact Garmin at 800-800-1020 or fly.garmin.com for more information or instructions.

1.7 Fault Detection and Exclusion (FDE)

The GTN, when installed as defined in this manual, complies with the requirements for GPS/SBAS primary means of navigation in oceanic and remote airspace when used in conjunction with the provided FDE prediction program.

The GTN includes internal Fault Detection and Exclusion (FDE) software which is active for all flight phases including oceanic and remote operations, en route and terminal, and precision and non-precision approaches. FDE does not require any pilot interaction. The FDE consists of two parts:

- The fault detection function detects a satellite failure that can affect navigation; and
- The exclusion function is the capability to exclude one or more failed satellites and prevent them from affecting navigation.

The FDE Prediction program is used to predict FDE availability. This program must be used prior to all oceanic or remote area flights for all operators using the GTN as a primary means of navigation under FAR parts 91, 121, 125, and 135. The FDE program is part of the GTN Trainer, available for download from the GTN product information page on Garmin's website, www.garmin.com.

1.8 Aviation Limited Warranty

All Garmin avionics products are warranted to be free from defects in materials or workmanship for: two years from the date of purchase for new Remote-Mount and Panel-Mount products; one year from the date of purchase for new portable products and any purchased newly-overhauled products; six months for newly-overhauled products exchanged through a Garmin Authorized Service Center; and 90 days for factory repaired or newly-overhauled products exchanged at Garmin in lieu of repair. Within the applicable period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer will be responsible for any transportation cost. This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage caused by service performed by anyone who is not an authorized service provider of Garmin; or (v) damage to a product that has been modified or altered without the written permission of Garmin. In addition, Garmin reserves the right to refuse warranty claims against products or services that are obtained and/or used in contravention of the laws of any country.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT WILL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Garmin retains the exclusive right to repair or replace (with a new or newly-overhauled replacement product) the product or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY WILL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

Online Auction Purchases: Products purchased through online auctions are not eligible for warranty coverage. Online auction confirmations are not accepted for warranty verification. To obtain warranty service, an original or copy of the sales receipt from the original retailer is required. Garmin will not replace missing components from any package purchased through an online auction.

International Purchases: A separate warranty may be provided by international distributors for devices purchased outside the United States depending on the country. If applicable, this warranty is provided by the local in-country distributor and this distributor provides local service for your device. Distributor warranties are only valid in the area of intended distribution. Devices purchased in the United States or Canada must be returned to the Garmin service center in the United Kingdom, the United States, Canada, or Taiwan for service.

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2 LIMITATIONS

2.1 Installation

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

The GTN GPS/SBAS receiver, when installed with an appropriate antenna listed in Section 1.3.8, is compatible with aircraft equipped with SATCOM when installed in accordance to this manual.

2.1.1 GPS Antenna

The GPS/SBAS receiver is compatible with the GPS/SBAS antennas listed in Section 1.3.8.

2.2 Aircraft Radio

An aircraft radio station license is not required when operating in U.S. airspace, but may be required when operating internationally.

As required by TSO-C169a, the quantitative safety objective for the VHF COM radio in the GTNs is 1×10^{-4} per flight hour for Class I Part 23 Airplanes, and 1×10^{-5} per flight hour for all other Part 23 airplanes and Parts 25, 27, and 29 aircraft.

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3 INSTALLATION OVERVIEW

3.1 Introduction

Always follow acceptable avionics installation practices per AC 43.13-1B, AC 43.13-2B, or later FAA approved revisions of these documents. The GPS/SBAS installation instructions have been prepared to meet the guidance material contained in AC 20-138A "Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment." The communications installation instructions have been prepared to meet the guidance material defined by AC 20-67B, "Airborne VHF Communications Equipment Installations."

3.2 Minimum System Configuration

3.2.1 VFR GPS Installation

The minimum GTN unit installation requires the following items for a VFR Installation:

- GTN 725/750 (installed in the aircraft manufacturer approved location for 6.25 inch wide avionics equipment)
- GPS/SBAS antenna required for GPS navigation functions.
- An external CDI is required for installations using the VOR navigation, localizer and glideslope information.
- A NAV antenna is required for VHF NAV functions. (GTN 750 only)
- A COM antenna is required for COM functions. (GTN 750 only)

VFR installations must be placarded "GPS LIMITED TO VFR USE ONLY" in clear view of the pilot.

3.2.2 IFR GPS Installations in Reciprocating, Single-Engine Aircraft 6000 lbs or Less

In order for the GTN unit to be utilized for IFR GPS Navigation, the criteria in Section 3.2.1 must be met in addition to the following:

- An external CDI/HSI indicator must be installed in the pilot's primary field-of-view (or in the aircraft manufacturer approved mounting location). The indicator must have a vertical deviation indicator (GS) in order to perform VNAV operations/approaches.
- GTN 725
- A VHF COM Radio

Refer to Section 1.5.5 for AFM/AFMS/POH considerations.

In order for the GTN unit to be utilized for IFR GPS Navigation, the criteria in Section 3.2.1 must be met in addition to the following:

- An external CDI/HSI indicator must be installed in the pilot's primary field-of-view (or in the aircraft manufacturer approved mounting location). The indicator must have a vertical deviation indicator (GS) in order to perform VNAV operations/approaches.
- GTN 725
- A VHF COM radio
- A second GPS Navigator **or** a VHF NAV radio

NOTE

To take full advantage of the GTN unit capabilities, an optional barometric altitude source is recommended for automatic sequencing of altitude leg types. If no barometric altitude data is provided to the GTN unit, altitude leg types must be manually sequenced.

3.2.3 IFR GPS Plus VOR/LOC/GS Installation

The minimum GTN unit installation requires the following items for an IFR VOR/LOC/GS installation:

- GTN 750 (installed in the aircraft manufacturer approved location)
- GPS antenna, NAV antenna, and COM antenna.
- An external CDI/HSI indicator must be installed in the pilot's primary field-of-view (or in the aircraft manufacturer approved mounting location). The indicator must have a vertical deviation indicator for glideslope, localizer and VNAV operations/approaches.
- A second GPS Navigator **or** a VHF NAV radio

3.3 External Sensors

When GTN is installed with external sensors, these sensors must be installed in accordance with the manufacturer's data. This manual does not provide information for the installation of specific external sensors.

The GTN can accept data from multiple altitude, heading, and baro correction sources. If multiple sources are used, the GTN will accept data as described below.

3.3.1 Multiple Uncorrected Pressure Altitude Sources

The GTN can accept altitude from a RS-232 altitude encoder, fuel/air data computer (FADC), ARINC 429 air data computer (ADC), ARINC 429 EFIS, and ARINC 429 traffic advisory system. If multiple sources of altitude data are supplied to the GTN, only valid data from the highest priority source is used (input priority cannot be configured). If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the altitude sources are as follows (from highest to lowest):

1. ARINC 429 Label 203 from Airdata
2. ARINC 429 Airdata/AHRS
3. ARINC 429 GDU Format 1, 2, 3, or 4
4. ARINC 429 EFIS Format 2
5. ARINC 429 Data Concentrator
6. ARINC 429 Traffic Format 1, 2, 3, 4, 5, or 6
7. RS-232 FADC Format 1 or Airdata Format 1
8. RS-232 Altitude Format 1 or 3

3.3.2 Multiple Baro-Corrected Altitude Sources

The GTN unit can accept baro-corrected altitude from multiple ARINC 429 and RS-232 sources.

If multiple sources of baro-corrected altitude data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. Priorities of the baro-corrected altitude sources are as follows from highest to lowest:

1. ARINC 429 label 204 from Airdata
2. ARINC 429 label 204 from GDU Format 1
3. ARINC 429 label 204 from EFIS Format 1, 2, 3, or 4
4. ARINC 429 label 204 from Data Concentrator
5. RS-232 FADC Format 1 or Airdata Format 1

3.3.3 Multiple Heading Sources

The GTN unit can accept heading data from multiple ARINC 429, RS-232, and Synchro sources. If multiple sources of heading data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. Priorities of the heading sources are as follows from highest to lowest:

1. ARINC 429 label 314 from EFIS Format 1 or Format 3
2. ARINC 429 label 320 from EFIS Format 1 or Format 3
3. ARINC 429 label 320 from EFIS Format 2
4. ARINC 429 label 320 from GDU Format 1
5. ARINC 429 label 314 from INS/IRU
6. ARINC 429 label 314 from Data Concentrator
7. ARINC 429 label 320 from INS/IRU
8. ARINC 429 label 320 from Airdata/AHRS
9. ARINC 429 label 320 from GAD Format 1
10. ARINC 429 label 320 from EFIS Format 4
11. ARINC 429 label 314 from GAD Format 1
12. XYZ Synchro
13. ARINC 429 label 320 from Data Concentrator
14. ARINC 429 label 320 from Traffic Format 1, 2, 3, 4, 5, or 6
15. RS-232 FADC Format 1 or Airdata Format 1
16. RS-232 bus from Lightning Detector 1

3.3.4 Multiple Indicated Airspeed Sources

The GTN unit can accept indicated airspeed data from multiple ARINC 429 and RS-232 sources. If multiple sources of indicated airspeed data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. Priorities of the indicated airspeed sources are as follows from highest to lowest:

1. ARINC 429 label 206 from GDU Format 1
2. ARINC 429 label 206 from Airdata/AHRS
3. ARINC 429 label 206 from Data Concentrator
4. RS-232 bus from FADC Format 1 or Airdata Format 1

3.3.5 Multiple True Airspeed Sources

The GTN unit can accept true airspeed data from multiple ARINC 429 and RS-232 sources. If multiple sources of true airspeed data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. Priorities of the true airspeed sources are as follows from highest to lowest:

1. ARINC 429 label 210 from Airdata
2. ARINC 429 label 210 from Airdata/AHRS
3. ARINC 429 label 210 from GDU Format 1
4. ARINC 429 label 210 from EFIS Format 2
5. ARINC 429 label 210 from GAD Format 1
6. ARINC 429 label 210 from Data Concentrator
7. RS-232 bus from FADC Format 1 or Airdata Format 1

3.3.6 Multiple VOR/LOC Selected Course Sources

The GTN unit can accept VOR/LOC selected course data from the sources list below. If multiple sources of VOR/LOC selected course data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. Priorities of the VOR/LOC selected course sources are as follows from highest to lowest:

1. ARINC 429 label 100 from EFIS Format 4
2. ARINC 429 label 110 from GAD Format 1
3. TO/FROM course from an Omni-Bearing Selector (OBS) control

3.3.7 Multiple GPS Selected Course Sources

The GTN unit can accept GPS selected course data from multiple ARINC 429 sources. If multiple sources of GPS selected course data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the GPS selected course sources are as follows from highest to lowest:

1. ARINC 429 label 100 from EFIS Format 1 or 3
2. ARINC 429 label 100 from GDU Format 1
3. ARINC 429 label 100 from EFIS Format 2
4. ARINC 429 label 100 from EFIS Format 4
5. ARINC 429 label 100 from GAD Format 1
6. ARINC 429 label 100 from Data Concentrator
7. TO/FROM course from an Omni-Bearing Selector (OBS) control

3.3.8 Multiple Total Air Temperature Sources

The GTN unit can accept total air temperature data from multiple ARINC 429 and RS-232 sources. If multiple sources of total air temperature data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the total air temperature sources are as follows from highest to lowest:

1. ARINC 429 label 211 from Airdata
2. ARINC 429 label 211 from GDU Format 1
3. ARINC 429 label 211 from EFIS Format 2
4. ARINC 429 label 211 from Data Concentrator
5. RS-232 bus from FADC Format 1 or Airdata Format 1

3.3.9 Multiple Static Air Temperature Sources

The GTN unit can accept static air temperature data from multiple ARINC 429 sources. If multiple sources of static air temperature data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the static air temperature sources are as follows from highest to lowest:

1. ARINC 429 label 213 from Airdata
2. ARINC 429 label 213 from GDU Format 1
3. ARINC 429 label 213 from EFIS Format 2
4. ARINC 429 label 213 from Data Concentrator

3.4 Antenna Considerations

This section contains mounting location considerations for the antennas required for the GTN units. For mounting the GPS/SBAS antenna, refer to FAA approved data. For mounting the COM and NAV antennas, refer to the aircraft manufacturer's data.

3.4.1 GPS Antenna Location

The GPS/SBAS antenna is a key element in the overall system performance and integrity for a GPS/SBAS navigation system. The mounting location, geometry, and surroundings of the antenna can affect the system performance and/or availability. The following guidance provides information to aid the installer in ensuring that the most optimum location is selected for the installation of the GPS antenna. The installation guidelines presented here meet the intent of AC 20-138A section 16. The greater the variance from these guidelines, the greater the chance of decreased availability. Approach procedures with vertical guidance are the most sensitive to these effects. LNAV only approaches, terminal operations, and en route operations may also be affected. Because meeting all of these installations guidelines may not be possible on all aircraft, these guidelines are listed in order of importance to achieve optimum performance. Items 3 below are of equal importance and their significance may depend on the aircraft installation. The installer should use their best judgment to balance the installation guidelines. Figure 3-1 shows the recommended placement of antennas.

1. Mount the antenna as close to level as possible with respect to the normal cruise flight attitude of the aircraft. If the normal flight attitude is not known, substitute the waterline, which is typically referenced as level while performing a weight and balance check.
2. The GPS antenna should be mounted in a location to minimize the effects of airframe shadowing during typical maneuvers. Typically mounting farther away from the tail section reduces signal blockage seen by the GPS antenna.

3a. The GPS antenna should be mounted no closer than two feet from any VHF COM antenna or any other antenna which may emit harmonic interference at the L1 frequency of 1575.42 MHz. An aircraft EMC check (reference VHF COM interference check in Post Installation Checkout procedures) can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, insert a GPS notch filter in line with the offending VHF COM or the (re-radiating) ELT transmitter.

Note: When mounting a combination antenna (ex. GPS and COM, GPS and XM), the recommended distance of two feet or more is not applicable to the distance between the antenna elements provided the combination antenna is TSO authorized and has been tested to meet Garmin's minimum performance standards.

3b. The GPS antenna should be mounted no closer than two feet from any antennas emitting more than 25 watts of power. An aircraft EMC check can verify the degradation of GPS in the presence of interference signals.

3c. To achieve the best possible low-elevation antenna gain (by minimizing pattern degradation due to shadowing and near-field interaction), the GPS antenna must be mounted with clearance from other antennas, including passive antennas such as another GPS antenna or XM antenna. When practical, installers will use 12 inch center-to-center spacing between antennas. If 12 inch spacing is not practical, installers will use the maximum center-to-center spacing from adjacent antennas, but never less than 9 inch center-to-center spacing. Spacing less than 9 inches center-to-center results in unacceptable GPS/SBAS antenna pattern degradation.

4. To maintain a constant gain pattern and limit degradation by the windscreen, avoid mounting the antenna closer than 3 inches from the windscreen.
5. For multiple GPS installations, the antennas should not be mounted in a straight line from the front to the rear of the fuselage. Also varying the mounting location will help minimize any aircraft shading by the wings or tail section (in a particular azimuth, when one antenna is blocked the other antenna may have a clear view).

3.4.2 COM Antenna Location

The GTN COM antenna should be well removed from all projections, engines and propellers. The ground plane surface directly below the antenna should be a flat plane over as large an area as possible (18 inch square, minimum). The antenna should be mounted a minimum of six feet from any DME or other COM antennas, four feet from any ADF sense antennas, and two feet from the GTN and its GPS antenna. The COM antenna should also be mounted as far apart as practical from the ELT antenna. Some ELTs have exhibited re-radiation problems generating harmonics that may interfere with GPS signals. This can happen when the COM (GTN or any other COM) is transmitting on certain frequencies such as 121.15 or 121.175 MHz, which may cause the ELT output circuit to oscillate from the signal coming in on the ELT antenna coax.

If simultaneous use of two COM transceivers is desired (split-COM or simul-comm), the COM antennas should be spaced for maximum isolation. A configuration of one topside antenna and one bottom side antenna is recommended. The GTN does not require a transmit interlock, but other COM radios such as the GNS 530W may require it for split COM operations.

NOTE

Canadian installations are required to meet Industry Canada specifications for maximum radiation as documented in Radio Specifications Standard 102 (RSS-102). For more information about RF exposure and related Canadian regulatory compliance, contact:

Manager, Radio Equipment Standards
Industry Canada
365 Laurier Avenue
Ottawa, Ontario
K1A 0C8

In accordance with Canadian Radio Specifications Standard 102 (RSS 102), RF field strength exposure to persons from an antenna connected to this device should be limited to 60V/m for controlled environment and 28 V/m for uncontrolled environment.

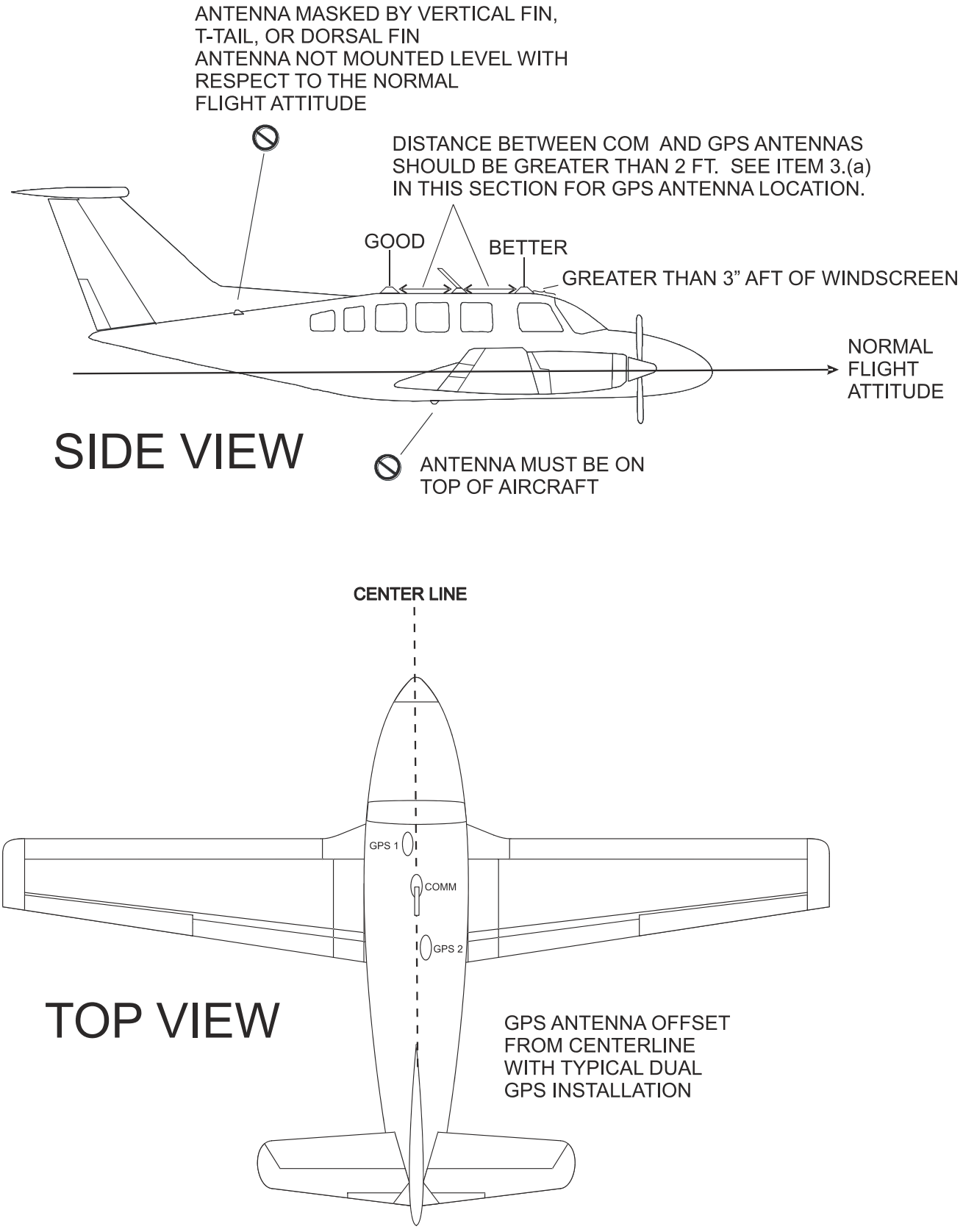

Figure 3-1. GPS Antenna Installation Considerations

3.4.3 VOR/LOC Antenna Location

The GTN VOR/LOC antenna should be well removed from all projections, engines and propellers. It should have as clear a field of sight as possible. The antenna must be mounted along the centerline of the aircraft, minimizing the lateral offset. Install the antennas according to the manufacturer's recommendations. Avoid running other wires and coaxial cables near the VOR/LOC antenna cable.

3.4.4 Glideslope Antenna Location

The GTN glideslope antenna should be well removed from all projections, engines and propellers. It should have as clear a field of sight as possible. Install the antenna according to the manufacturer's recommendations.

3.4.5 Electrical Bonding

Ensure that the GPS/NAV/COM antennas are electrically bonded to the aircraft. Follow the aircraft manufacturers' instructions for the NAV and COM antenna installations, or obtain other FAA approval.

3.4.6 Interference of GPS

On some installations, VHF COM transceivers, Emergency Locator Transmitter (ELT) antennas, and Direction Finder (DF) receiver antennas can re-radiate through the GPS antenna. The GTN COM does not interfere with its own GPS section. However, placement of the GPS antenna relative to a COM transceiver and COM antenna (including the GTN COM antenna), ELT antenna, and DF receiver antenna is critical.

Use the following guidelines, in addition to others in this document, when locating the GTN and its antennas.

- GPS Antenna—Locate as far as possible from all COM antennas and all COM transceivers (including the GTN COM), ELT antennas, and DF receiver antennas. The GPS antenna is less susceptible to harmonic interference if a 1.57542 GHz notch filter is installed on the COM transceiver antenna output.
- Locate the GTN as far as possible from all COM antennas.

If a COM antenna is found to be the problem, a 1.57542 GHz notch filter (Garmin P/N 330-00067-00) may be installed in the VHF COM coax, as close to the COM as possible. This filter is not required for the GTN transmitter.

If a COM is found to be radiating, the following can be done:

- Replace or clean VHF COM rack connector to ensure good coax ground.
- Place a grounding brace between the GTN, VHF COM and ground.
- Shield the VHF COM wiring harness.

3.5 GTN 725/750 Mounting Considerations

The GTN is designed to mount in the avionics stack in the aircraft instrument panel within view and reach of the pilot. The primary unit location should minimize pilot head movement when transitioning between looking outside of the cockpit and viewing/operating the GTN. The location should be such that the GTN unit is not blocked by the glare shield on top, or by the throttles, control yoke, etc. on the bottom. If aircraft has a throw-over yoke, be sure the yoke does not interfere with the GTN.

3.6 Cabling and Wiring Considerations

Wiring should be installed in accordance with AC 43.13-1B Chapter 11. For dual GTN unit installations, care should be taken to ensure separation between wires of redundant systems to reduce the possibility of loss of navigation due to a single event. When wire separation cannot be achieved, the following issues should be addressed:

- It should not be possible for a cable harness to be exposed to wire chafing in a manner that both GPS units fail simultaneously;
- The cable harness should not be located near flight control cables and controls, high voltage lines or fuel lines;
- The cable harness should be located in a protected area of the aircraft (e.g., isolated from engine rotor burst); and
- Do not route cable near high voltage sources.

NOTE

Pigtail lengths must be less than 3.0 inches. Wiring which is required to be shielded must be shielded per Appendix D.

Refer to Section 4.8 and Section 4.9 for connector and tooling information.

Refer to Section 4.11 for recommended coax cable.

Refer to Appendix D for the appropriate wiring connections to assemble the wiring connector.

Once the cable assemblies have been made, attach the cable connectors to the rear connector plate. After installing the mounting tube, attach the assembled connector plate. Route the wiring bundle as appropriate. Use 22 or 24 AWG wire for all connections. For power and ground, use the wire gauge specified in the interconnect drawing, then 22 AWG for the short length from the splice to the connector. Avoid sharp bends.

3.7 Air Circulation and Cooling

CAUTION

To avoid damage to the GTN, take precautions to prevent Electro-Static Discharge (ESD) when handling the GTN, connectors, fan, and associated wiring. ESD damage can be prevented by touching an object that is of the same electrical potential as the GTN before handling the GTN itself.

The GTN unit meets all TSO requirements without external cooling. However, as with all electronic equipment, lower operating temperatures extend equipment life. Reducing the operating temperature by 15° to 20°C (27° to 36°F) reduces the mean time between failures (MTBF).

Units tightly packed in the avionics stack heat each other through radiation, convection, and sometimes by direct conduction. Even a single unit operates at a much higher temperature in still air than in moving air. Fans or some other means of moving the air around electronic equipment are usually a worthwhile investment.

The GTN has a cooling fan integrated into the backplate to draw forced-air cooling through the unit. There are inlets along the left, right, and bottom sides of the GTN bezel that allow air to flow through the unit. Ensure that there are no obstructions to the air inlets or fan exhausts. Air should be able to freely flow from the bezel inlets to the backplate fan outlet on the rear of the unit.

3.8 Compass Safe Distance

After reconfiguring the avionics in the cockpit panel, if the GTN unit is mounted less than 12 inches from the compass, recalibrate the compass and make the necessary changes for noting correction data.

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4 INSTALLATION PROCEDURES

4.1 Unit and Accessories

For description of units see Table 1-1.

Table 4-1. Catalog Part Numbers

Model	Unit Only Kit	Standard Kit	Unit P/N	Color	COM
GTN 725	010-00819-00	010-00819-50	011-02281-00	BLK	
GTN 750	010-00820-00	010-00820-50	011-02282-00	BLK	10W [1]
	010-00890-00	010-00890-50	011-02282-50	GRY	10W [1]

[1] Unit is available with COM and is calibrated for both 10W and 16W COM; 16W COM is a software enablement feature using an enablement card.

Table 4-2. Standard Kit Accessories

Model	Item	Part Number
GTN 725	Configuration Module Kit	011-00979-00
	Connector Kit	011-02326-00
	Backplate Assembly	011-02246-00
	Mounting Rack	115-01294-00
	Product Information Kit	K00-00488-00
GTN 750	Configuration Module Kit	011-00979-00
	Connector Kit	011-02326-02
	Backplate Assembly	011-02246-02
	Mounting Rack	115-01294-00
	Product Information Kit	K00-00488-00

Table 4-3. Replacement Fan Parts

Model	Item	Part Number
GTN 725 **GTN 750**	Fan with Connector	371-00014-01
	Fan Mounting Screws (Qty 4)	211-60234-23

4.2 Optional Accessories

4.2.1 GPS Antenna Options

For details regarding antenna selection, refer to Section 1.3.8. Once the antenna type is decided upon, refer to the information below for detailed parts information for antennas available directly from Garmin. Contact manufacturer directly for information on other antennas.

GA 35 Antenna:

GA 35 Antenna Garmin P/N 013-00235-00 contains the following items:

Item	Part Number	Qty
GA 35 GPS/ WAAS Antenna [1]	013-00235-00 (Garmin)	1
	AT575-93G (Aero Antenna)	

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

GA 36 Antenna:

GA 36 Antenna Garmin P/N 013-00244-00 contains the following items:

Item	Part Number	Qty
GA 36 GPS/WAAS Antenna [1]	013-00244-00 (Garmin)	1
	AT575-126G (Aero Antenna)	

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

GA 37 Antenna:

GA 37 Antenna Garmin P/N 013-00245-00 contains the following items:

Item	Part Number	Qty
GA 37 GPS/WAAS + XM Antenna [1]	013-00245-00 (Garmin)	1
	AT2300-126G (Aero Antenna)	

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

A33W Antenna:

A33W Antenna Garmin P/N 013-00261-00 contains the following items:

Item	Part Number	Qty
A33W, WAAS [1]	013-00261-00 (Garmin)	1

[1] Antenna includes 6-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. To secure the antenna, #6 washers (qty 4) and #6 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler that is used. To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

4.3 Database Options

Item	Garmin P/N
GTN 6XX/7XX Database	010-00900-00
GTN 6XX/7XX Database, Americas	010-00900-10
GTN 6XX/7XX Database, International	010-00900-20
GTN 6XX/7XX Database, Worldwide	010-00900-30

4.4 Miscellaneous Options

Item	Garmin P/N	Mfg P/N
Connector, BNC, Male, Clamp	330-00087-00	N/A
GPS 1.57542 GHz Notch Filter	330-00067-00	N/A
Connector, TNC, Male, Clamp	N/A	031-4452 [1]

[1] This part is not available from Garmin.

Vendor Contact Information (provided for convenience only):

Amphenol RF, Four Old Newtown Road, Danbury, CT 06810 Phone: 800-627-7100

4.5 Optional Reference Material

Item	Garmin P/N
GTN 725/750 Pilot's Guide	190-01007-03
GTN 725/750 Cockpit Reference Guide	190-01007-04
GTN 725/750 Training Software	006-A0411-( )

4.6 Enablement Cards

Item	Garmin P/N
GTN 7XX 16 Watt COM Enablement Card [1]	010-00878-04
GTN 7XX ChartView Enablement Card [1]	010-00878-40
GTN 7XX Internal TAWS-B Enablement Card [1]	010-00878-01

[1] An SD enablement card is required to enable the indicated feature. Each enablement card can only be used one time, and once used, the card will only work with that particular GTN.

4.7 Installation Materials Required but not Supplied

4.7.1 Accessories Required but not Supplied

The following installation accessories are required but not provided.

Item	Requirements
COM Antenna (GTN 750 only)	Meets TSO-C37( ) and C38( ) **or** TSO-C169( ). 50Ω, vertically polarized with coaxial cable
NAV Antenna (GTN 750 only)	Meets TSO C40( ) and C36( ). 50Ω, horizontally polarized with coaxial cable. Note that if the NAV antenna is a combined VOR/LOC/GS antenna, it must meet TSO C40( ), C36( ), and C34( ).
Glideslope Antenna (GTN 750 only)	Meets TSO-C34( ). 50Ω, horizontally polarized with coaxial cable or low-loss splitter used with the VOR/LOC antenna.
Headphones	500Ω nominal impedance
Microphone	Low impedance, carbon or dynamic, with transistorized pre-amp

4.7.2 Materials Required but not Supplied (New Installations Only)

The GTN is intended for use with the standard aviation accessories. The following items are required for installation, but not supplied:

- Wire (MIL-W-22759/16 or equivalent)
- Shielded Wire (MIL-C-27500 or equivalent)
- Mounting Screws (8 minimum – MS24693 Screw, Machine, Flat Countersunk Head 100°, Cross-recessed with .1380-32 UNC-2A Thread, Corrosion Resistant Steel)
- Push/Pull (manually resettable) Circuit Breakers
- Tie Wraps or Lacing Cord
- Ring Terminals (for grounding)
- Coaxial Cable (RG-400, RG-142B or equivalent – Refer to Section 4.11 for additional information).

4.7.3 Optional Annunciation Panels

An external GPS annunciation panel may be required for some installations. The following indicators and indicator/switches are available for external GPS annunciation.

Manufacturer	Part Number	Type	Notes
Mid-Continent	MD41-1408A	Indicator/Switch/GPS Annunciations	5 VDC, 14 VDC, and 28 VDC indicators available. The MD41-151X ACU is the preferred indicator, although the MD41-14XX ACU is acceptable.
	MD41-1404A		
	MD41-1418A		
	MD41-1414A		
	MD41-1464A		
	MD41-1468A		
	MD41-1470		
	MD41-1474A		
	MD41-1478A		
	MD41-1484W		
	MD41-1488W		
	MD41-1510		
	MD41-1511		
	MD41-1512		
	MD41-1513		
	MD41-1514		
	MD41-1515		

Vendor Contact Information (provided for convenience only):

Mid-Continent Instrument Co Inc., 9400 E. 34th Street N., Wichita, KS 67226, Phone: (316) 630-0101, www.mcico.com.

4.8 Special Tools Required

Some of the connectors use crimp contacts. The table below identifies crimp tools required to ensure consistent, reliable crimp contact connections for the rear D-sub connectors.

Table 4-4. Recommended Crimp Tools (or Equivalent)

Manufacturer	Hand Crimping Tool	22 – 28 AWG (P1001 – P1005)	
		Positioner	Insertion/ Extraction Tool
Military P/N	M22520/2-01	M22520/2-09	M81969/14-01 M81969/1-04
Positronic	9507-0-0-0	9502-4-0-0	M81969/1-04
ITT Cannon	995-0001-584	995-0001-739	000849490 274-7048-000MIL
AMP	601966-1	601966-6	91067-1 2031838-1
Daniels	AFM8	K42	M81969/14-01 M81969/1-04
Astro	615717	615725	M81969/14-01 M81969/1-04

NOTE

Insertion/extraction tools from ITT Cannon are all plastic; others are plastic with metal tip.

4.9 Coaxial Cable Installation

Follow the steps below for installation of the coaxial cables:

1. Route the coaxial cable to the radio rack location keeping in mind the recommendations of Section 3.4. Secure the cable in accordance with AC 43.13-1B Chapter 11, section 11.
2. Trim the coaxial cable to the desired length and install the TNC and BNC connectors per the cabling instructions on Figure 4-1 below. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

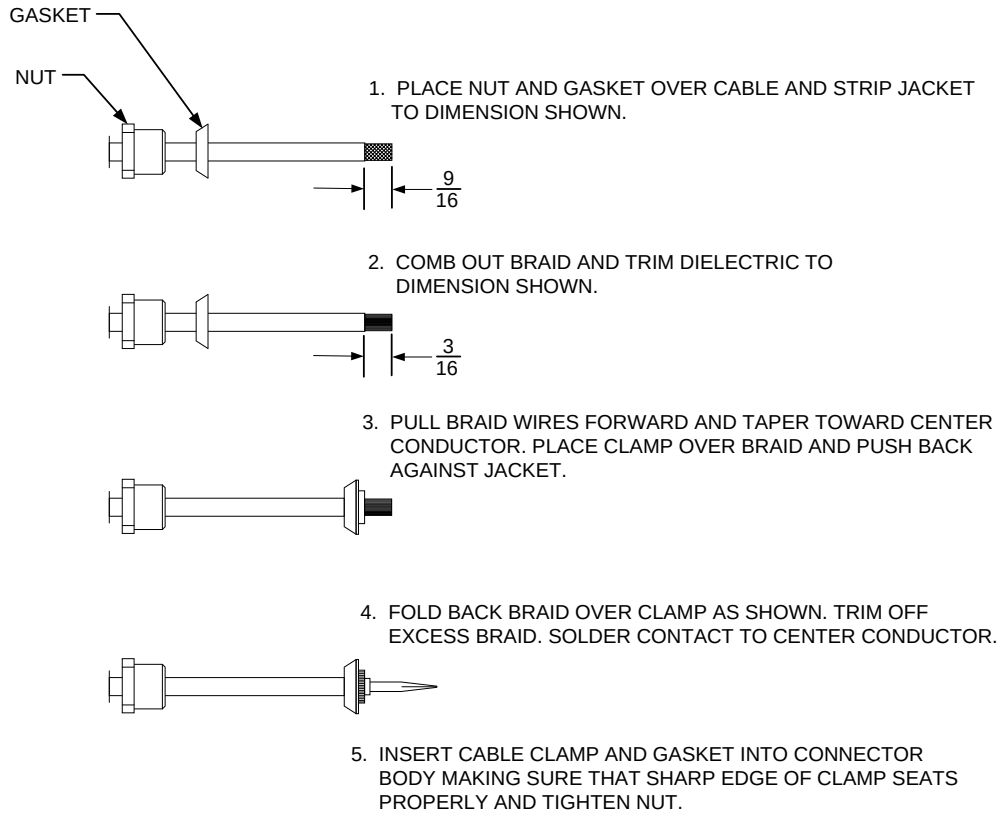

GASKET
NUT
1. PLACE NUT AND GASKET OVER CABLE AND STRIP JACKET TO DIMENSION SHOWN.
9/16
2. COMB OUT BRAID AND TRIM DIELECTRIC TO DIMENSION SHOWN.
3/16
3. PULL BRAID WIRES FORWARD AND TAPER TOWARD CENTER CONDUCTOR. PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST JACKET.
4. FOLD BACK BRAID OVER CLAMP AS SHOWN. TRIM OFF EXCESS BRAID. SOLDER CONTACT TO CENTER CONDUCTOR.
5. INSERT CABLE CLAMP AND GASKET INTO CONNECTOR BODY MAKING SURE THAT SHARP EDGE OF CLAMP SEATS PROPERLY AND TIGHTEN NUT.

Figure 4-1. Coaxial Cable Installation

Table 4-5. Socket Contact Part Numbers

Wire Gauge	Configuration Module 78-pin Connector (P1001)	P1001-P1005
	28 AWG [1]	22-28 AWG [2]
Garmin P/N	336-00021-00	336-00021-00
Military P/N	N/A	M39029/58-360
AMP	N/A	204370-2
Positronic	N/A	MC8522D
ITT Cannon	N/A	010-2042-000

[1] For configuration module pins, ensure that the crimp tool is set to crimp 28 AWG wire (indenter setting of '4').

[2] Contacts listed are not to be used for configuration module wiring. Use the contacts supplied with the configuration module when installing configuration module wires in P1001.

[3] Non-Garmin part numbers shown are not maintained by Garmin and are subject to change without notice.

4.10 Equipment Mounting

4.10.1 Rack Installation

Use the dimensions shown in Figure C-3 to prepare the mounting holes for the GTN unit. You may also use the GTN unit mounting rack itself as a template for drilling the mounting holes.

1. Figure C-1 shows outline dimensions for the avionics rack for the various GTN units. Install the rack in a rectangular 6.32" x 4.60" hole (or gap between units) in the instrument panel. The lower-front lip of the rack should be flush with, or extend slightly beyond, the finished aircraft panel.

NOTE

If the front lip of the mounting rack is behind the surface of the aircraft panel, the GTN unit connectors may not fully engage. Figure C-4 for more information. Ensure that no screw heads or other obstructions prevent the unit from fully engaging in the rack (see the "Connector Engagement Test," Section 6.3). Exercise caution when installing the rack into the instrument panel. Deformation of the rack may make it difficult to install and remove the GTN unit.

2. Install the rack in the aircraft panel using ten #6-32 flat head screws and ten self-locking nuts. The screws are inserted from the inside through the holes in the sides of the rack.
3. To attach the backplate to the rack, align the backplate so that the backplate screw heads pass through the keyed holes in the back of the rack.
4. Slide the backplate to the right (viewing from cockpit) until it clicks into place. Secure the backplate by tightening the four #4-40 screws.

4.10.2 GTN Unit Insertion and Removal

It may be necessary to insert the hex drive tool into the access hole and rotate the drive tool counterclockwise until it completely stops in order to ensure correct position of the retention mechanism prior to placing the unit in the rack. The GTN unit is installed in the rack by sliding it straight in until it stops, about 3/8 inch short of the final position. A 3/32-inch hex drive tool is then inserted into the access hole at the bottom of the unit face. Rotate the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

To remove the unit from the rack, insert the hex drive tool into the access hole on the unit face. Rotate counterclockwise until the unit is forced out about 3/8 inches and the hex drive tool completely stops. This will allow the unit to be freely pulled from the rack.

Be sure not to over tighten the unit into the rack. The application of hex drive tool torque exceeding 15 in-lbs can damage the locking mechanism.

4.10.3 Unit Replacement

Whenever the GTN unit is removed or reinstalled, verify that the unit power-up self-test sequence is successfully completed and no failure messages are annunciated. Section 6.11.1 outlines the power-up self-test sequence.

4.11 Antenna Installation and Connections

4.11.1 GPS Antenna

This section provides information on the antenna cable installation. Refer to 3.4 herein for installation location considerations.

NOTE

The internal GTN unit COM does not interfere with its own GPS/SBAS receiver. However, placement of the GTN unit antenna relative to other COM transceivers and antennas (including the GTN unit COM antenna) is critical.

SUGGESTION*:* Temporarily locate the GPS/SBAS antenna with coax connected to the GTN unit and check the GPS/SBAS performance as described in Section 6.11.2 . Once a suitable location has been verified, then permanently mount the antenna.

Once the antenna mounting position has been prepared, route the coax cable from the antenna to the GTN unit. Proper selection of coax cable and assembly of connectors is critical to GPS signal performance. **Cable loss from the GPS/SBAS antenna must be between 1.5 dB and 6.5 dB in order to maintain proper rejection to interference signals.**

Coaxial connectors and adapters, such as TNC to BNC, add additional loss to the cable and should be considered when computing the cable loss. A typical loss of 0.2 dB can be used for each connection. To maintain integrity of the SBAS signal, the GPS antenna coaxial cable must have a minimum of two shields (e.g. RG-400 or RG-142B).

NOTE

If RG-142B or RG-400 is used, 1.5 dB equates to a length of approximately 6.5 feet of cable with a connector on each end. RG-142B or RG-400 cable can be used as long as the length is less than 35 feet. For longer lengths, use low-loss double or triple shielded 50Ω coax.

For very short runs, where the loss is less than 1.5 dB, additional cable should be used to increase the loss to within 1.5 dB to 6.5 dB. This additional cable may be coiled, taking into account the minimum bend radius of the cable.

During the post-installation checkout, susceptibility to harmonics of VHF COM transmitters will be evaluated. If problems arise, then better isolation, or distance, may be required between the GPS and COM antennas, or a 1575.42 MHz notch filter may be installed in series with the antenna coax of the VHF COM transceiver to reduce or eliminate the harmonic interference. A notch filter for this use (P/N 330-00067-00) is available from Garmin.

If a VHF COM transmitter causes problems with the GPS on the selected frequencies as listed in the post-installation checkout, the problem may be due to the ELT. This can be verified by disconnecting the ELT antenna coax at the ELT unit. If the ELT is found to cause the problem, then contact the ELT manufacturer or replace the ELT.

4.11.2 COM Antenna (GTN 750 Only)

The GTN unit requires a standard 50Ω vertically polarized antenna. Follow the antenna manufacturer's installation instructions for mounting the antenna.

The antenna should be mounted on a metal surface or a ground plane with a minimum area of 18 inches x 18 inches. Refer to Section 3.4.2 for installation location considerations.

The antenna coax cable should be made of RG-142B, RG-400 or a comparable quality 50Ω coax.

Check for insertion loss and VSWR (voltage standing wave ratio). VSWR should be checked with an in-line type VSWR/wattmeter inserted in the coaxial transmission line between the transceiver and the antenna. The VSWR should be inserted as close to the transceiver as possible. When rack and harness buildup is performed in the shop, the coax termination may be provisioned by using a 6-inch inline BNC connection. This would be an acceptable place to insert the VSWR. Any problem with the antenna installation is most likely seen as high reflected power. A VSWR of 3:1 may result in up to a 50% loss in transmit power.

4.11.3 NAV Antenna (GTN 750 Only)

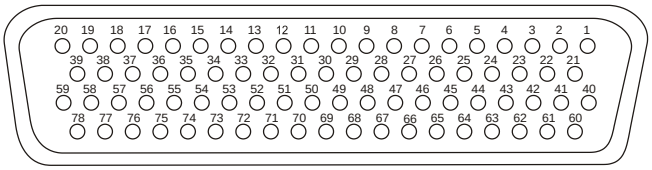
The NAV antenna is a standard 50Ω horizontally polarized VOR/Localizer/Glideslope antenna (the glideslope may be a separate antenna in some aircraft) that receives VOR frequencies between 108 and 117.95 MHz, and localizer frequencies between 108 and 112 MHz, and glideslope information between 328.6 and 335.4 MHz Follow the antenna manufacturer's installation instructions for mounting antennas. It is recommended that the installer use RG-142B, RG-400 or equivalent 50Ω coax for the NAV antenna(s).

5 CONNECTOR PINOUT INFORMATION

5.1 Pin Function List

5.1.1 P1001 Connector – Main Board

(View looking at rear of unit, Pin 1 is top right)



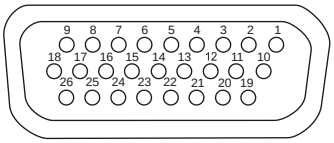
Pin	Pin Name	I/O
1	MAIN OBS ROTOR H (GND)	--
2	MAIN OBS ROTOR C	Out
3	TIME MARK OUT A	Out
4	AUDIO OUT HI	Out
5	RS-232 OUT 4	Out
6	RS-232 OUT 3	Out
7	RS-232 OUT 2	Out
8	RS-232 OUT 1	Out
9	ARINC 429 OUT 2A	Out
10	ARINC 429 OUT 1A	Out
11	MAIN +TO OUT	Out
12	MAIN VERTICAL +UP OUT	Out
13	MAIN LATERAL SUPERFLAG OUT	Out
14	OBS ANNUNCIATE*	Out
15	GPS ANNUNCIATE*	Out
16	OBS MODE SELECT*	In
17	LIGHTING BUS 1 LO	In
18	LIGHTING BUS 1 HI	In
19	AIRCRAFT POWER	In
20	AIRCRAFT POWER	In
21	MAIN OBS STATOR D	In
22	TIME MARK OUT B	Out
23	AUDIO OUT LO	Out
24	RS-232 IN 4	In
25	RS-232 IN 3	In
26	RS-232 IN 2	In
27	RS-232 IN 1	In
28	ARINC 429 OUT 2B	Out
29	ARINC 429 OUT 1B	Out
30	MAIN +FROM OUT	Out
31	MAIN VERTICAL +DOWN OUT	Out
32	MAIN VERTICAL SUPERFLAG OUT	Out
33	WAYPOINT ANNUNCIATE*	Out
34	TERMINAL ANNUNCIATE*	Out
35	TAWS AUDIO ACTIVE OUT*	Out
36	AUDIO INHIBIT IN*	In
37	TAWS INHIBIT IN*	In
38	AIR/GROUND*	In
39	CDI SOURCE SELECT*	In
40	MAIN OBS STATOR E (GND)	--
41	MAIN OBS STATOR F	In

P1001 Connector Cont'd		
Pin	**Pin Name**	**I/O**
42	LIGHTING BUS 2 LO	In
43	FAN GROUND	--
44	RS-232 GND 3/4	--
45	RS-232 GND 2	--
46	RS-232 GND 1	--
47	ARINC 429 IN 2A	In
48	ARINC 429 IN 1A	In
49	MAIN LATERAL +LEFT OUT	Out
50	MAIN LATERAL +FLAG OUT	Out
51	MAIN VERTICAL +FLAG OUT	Out
52	VOR/LOC ANNUNCIATE*	Out
53	LOI ANNUNCIATE*	Out
54	MESSAGE ANNUNCIATE*	Out
55	APPROACH ANNUNCIATE*	Out
56	ILS/GPS APPROACH	Out
57	TAWS INHIBIT ANNUNCIATE*	Out
58	FAN TACH IN	In
59	FAN POWER OUT (12 VDC)	Out
60	MAIN OBS STATOR G (GND)	--
61	LIGHTING BUS 2 HI	In
62	CONFIG MODULE DATA	I/O
63	CONFIG MODULE CLOCK	Out
64	CONFIG MODULE GND	Out
65	CONFIG MODULE POWER	Out
66	ARINC 429 IN 2B	In
67	ARINC 429 IN 1B	In
68	MAIN LATERAL +RIGHT OUT	Out
69	MAIN LATERAL -FLAG OUT	Out
70	MAIN VERTICAL -FLAG OUT	Out
71	TERRAIN WARNING ANNUNCIATE*	Out
72	TERRAIN NOT AVAILABLE ANNUNCIATE*	Out
73	TERRAIN CAUTION ANNUNCIATE*	Out
74	GPS SELECT*	Out
75	TRAFFIC TEST*	Out
76	TRAFFIC STANDBY*	Out
77	AIRCRAFT GND	--
78	AIRCRAFT GND	--

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate. If there is no asterisk, the signal is Active-High.

5.1.2 P1002 Connector – Main Board

(View looking at rear of unit, Pin 1 is top right)

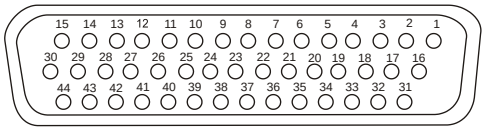


Pin	Pin Name	I/O
1	DEMO MODE SELECT*	In
2	RESERVED	--
3	SUSPEND ANNUNCIATE*	Out
4	ETHERNET OUT 4A	Out
5	ETHERNET OUT 4B	Out
6	ETHERNET IN 1A	In
7	ETHERNET IN 1B	In
8	ETHERNET OUT 1A	Out
9	ETHERNET OUT 1B	Out
10	SYSTEM ID PROGRAM*	In
11	SPARE DISC IN D*	In
12	SPARE DISC OUT B*	Out
13	ETHERNET IN 4A	In
14	ETHERNET IN 4B	In
15	ETHERNET IN 2A	In
16	ETHERNET IN 2B	In
17	ETHERNET OUT 2A	Out
18	ETHERNET OUT 2B	Out
19	RS-422 IN A	In
20	RS-422 IN B	In
21	RS-422 OUT A	Out
22	RS-422 OUT B	Out
23	ETHERNET IN 3A	In
24	ETHERNET IN 3B	In
25	ETHERNET OUT 3A	Out
26	ETHERNET OUT 3B	Out

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate. If there is no asterisk, the signal is Active-High.

5.1.3 P1003 Connector – COM Board

(View looking at rear of unit, Pin 1 is top right)

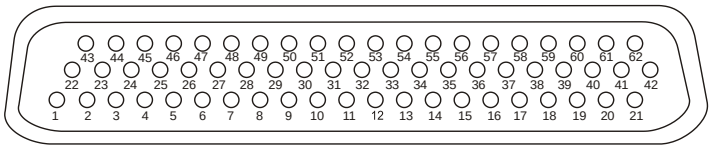


Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	RESERVED	--
4	RESERVED	--
5	COM MIC 1 AUDIO IN HI	In
6	RESERVED	--
7	500Ω COM AUDIO HI	Out
8	RESERVED	--
9	RESERVED	--
10	RESERVED	--
11	COM MIC 1 KEY*	In
12	INTERCOM ENABLE* RESERVED	In
13	RESERVED	--
14	RESERVED	--
15	RESERVED	--
16	RESERVED	--
17	RESERVED	--
18	500Ω COM AUDIO LO	--
19	RESERVED	--
20	MIC AUDIO IN LO	In
21	RESERVED	--
22	RESERVED	--
23	RESERVED	--
24	RESERVED	-
25	RESERVED	-
26	RESERVED	-
27	COM REMOTE TRANSFER*	In
28	COM REMOTE TUNE UP*	In
29	COM REMOTE TUNE DOWN*	In
30	AIRCRAFT POWER	In
31	RESERVED	--
32	RESERVED	--
33	RESERVED	--
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--
37	AIRCRAFT GND	--
38	AIRCRAFT GND	--
39	RESERVED	--
40	AIRCRAFT GND	--
41	RESERVED	--
42	RESERVED	--
43	AIRCRAFT POWER	In
44	AIRCRAFT POWER	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate. If there is no asterisk, the signal is Active-High.

5.1.4 P1004 Connector – NAV Board

(View looking at rear of unit, Pin 1 is on bottom left)

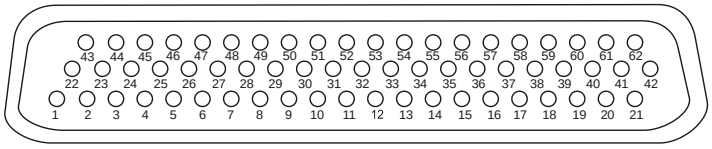


Pin	Pin Name	I/O
1	VOR/LOC +TO	Out
2	VOR/LOC +FROM	Out
3	VOR/LOC +FLAG	Out
4	VOR/LOC -FLAG	Out
5	VOR/LOC +LEFT	Out
6	VOR/LOC +RIGHT	Out
7	RESERVED	--
8	VOR/LOC COMPOSITE OUT	Out
9	VOR OBS ROTOR C	Out
10	VOR OBS ROTOR H (GND)	--
11	VOR OBS STATOR E (GND)	--
12	VOR OBS STATOR F	In
13	VOR OBS STATOR D	In
14	VOR OBS STATOR G (GND)	--
15	VOR/LOC SUPERFLAG	Out
16	500Ω VOR/LOC AUDIO OUT HI	Out
17	500Ω VOR/LOC AUDIO OUT LO	Out
18	SERIAL DME - CLOCK	In/Out
19	SERIAL DME - DATA	In/Out
20	SERIAL DME- RNAV/CH REQ	In
21	SERIAL DME - RNAV MODE	In
22	AIRCRAFT GND	--
23	VOR/ILS ARINC 429 OUT B	Out
24	VOR/ILS ARINC 429 OUT A	Out
25	VOR OBI CLOCK	In
26	VOR OBI SYNC	In
27	VOR OBI DATA	In
28	VLOC REMOTE TRANSFER	In
29	ILS ENERGIZE	Out
30	RESERVED	--
31	RESERVED	--
32	GLIDESLOPE +FLAG	Out
33	PAR DME 1MHZ-D/SERIAL DME ON	Out
34	GLIDESLOPE +UP	Out
35	VOR/ILS ARINC 429 IN B	In
36	VOR/ILS ARINC 429 IN A	In
37	PAR DME 100KHZ-A/SERIAL DME HOLD	Out
38	GLIDESLOPE SUPERFLAG	Out
39	PAR DME 100KHZ-B	Out
40	PAR DME 100KHZ-C	Out
41	DME COMMON	In
42	PAR DME 100KHZ-D	Out
43	PAR DME 50KHZ	Out
44	SERIAL DME - DME REQUEST	In/Out
45	PAR DME 1MHZ-A	Out
46	PAR DME 1MHZ-B	Out

P1004 Connector Cont'd		
Pin	**Pin Name**	**I/O**
47	PAR DME 1MHZ-C	Out
48	RESERVED	--
49	AIRCRAFT GND	--
50	RESERVED	--
51	AIRCRAFT POWER	In
52	AIRCRAFT POWER	In
53	GLIDESLOPE -FLAG	Out
54	PAR DME 100KHZ-E	Out
55	GLIDESLOPE +DOWN	Out
56	PAR DME 1MHZ-E	Out
57	RESERVED	--
58	GLIDESLOPE COMPOSITE OUT	Out
59	DIGITAL AUDIO OUT	Out
60	AIRCRAFT GND	--
61	AIRCRAFT GND	--
62	AIRCRAFT GND	--

5.1.5 P1005 Connector – I/O Board

(View looking at rear of unit, Pin 1 is on bottom left)



Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	RESERVED	--
4	RESERVED	--
5	RESERVED	--
6	RESERVED	--
7	ARINC 429 OUT 3B	Out
8	RS-232 OUT 5	Out
9	RS-232 OUT 6	Out
10	RESERVED	--
11	RESERVED	--
12	RESERVED	--
13	RESERVED	--
14	SYNCHRO Y	In
15	SYNCHRO REF LO	In
16	ARINC 429 IN 3B	In
17	ARINC 429 IN 4B	In
18	RESERVED	--
19	RESERVED	--
20	RESERVED	--
21	RESERVED	--
22	RESERVED	--
23	RESERVED	--
24	RESERVED	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	ARINC 429 OUT 3A	Out
29	RS-232 IN 5	In
30	RS-232 IN 6	In
31	RESERVED	--
32	RESERVED	--
33	SYNCHRO VALID INPUT (ACTIVE LO)	In
34	SPARE OUTPUT C	Out
35	SYNCHRO X	In
36	SYNCHRO REF HIGH	In
37	ARINC 429 IN 3A	In
38	ARINC 429 IN 4A	In
39	RESERVED	--
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	RESERVED	--

P1005 Connector Cont'd		
Pin	**Pin Name**	**I/O**
44	RESERVED	--
45	RESERVED	--
46	RESERVED	--
47	RESERVED	--
48	RESERVED	--
49	RS-232 GND 5	--
50	RS-232 GND 6	--
51	RESERVED	--
52	RESERVED	--
53	SPARE INPUT 1	--
54	SYNCHRO VALID INPUT (ACTIVE HI)	In
55	RESERVED	--
56	SYNCHRO Z	In
57	RESERVED	--
58	RESERVED	--
59	RESERVED	--
60	RESERVED	--
61	RESERVED	--
62	RESERVED	--

5.2 Power, Lighting, And Antennas

This section covers the power input requirements, lighting bus input, and antenna connections. See Appendix D for interconnect information.

5.2.1 Power

Pin Name	Connector	Pin	I/O
AIRCRAFT POWER (MAIN)	P1001	19	In
AIRCRAFT POWER (MAIN)	P1001	20	In
AIRCRAFT POWER (COM)	P1003	30	In
AIRCRAFT POWER (COM)	P1003	43	In
AIRCRAFT POWER (COM)	P1003	44	In
AIRCRAFT POWER (NAV)	P1004	51	In
AIRCRAFT POWER (NAV)	P1004	52	In
AIRCRAFT GROUND (MAIN)	P1001	77	--
AIRCRAFT GROUND (MAIN)	P1001	78	--
AIRCRAFT GROUND (COM)	P1003	37	--
AIRCRAFT GROUND (COM)	P1003	38	--
AIRCRAFT GROUND (COM)	P1003	40	--
AIRCRAFT GROUND (NAV)	P1004	60	--
AIRCRAFT GROUND (NAV)	P1004	61	--
AIRCRAFT GROUND (NAV)	P1004	62	--

Power inputs P1001-19 and P1001-20 provide power for everything except for the COM radio and NAV radio. Both pins must be connected.

Power inputs P1003-30, P1003-43, and P1003-44 provide power for the COM radio. All three pins must be connected.

Power inputs P1004-51 and P1004-52 provide power for the NAV radio. Both pins must be connected.

5.2.2 Lighting Bus

CAUTION

Connection of the lighting bus to incorrect pins can cause damage to the unit that will require return to the factory for repair. Ensure that the lighting bus is connected to the correct pins and does not short to any adjacent pins prior to applying power to the unit, including the lighting bus.

Pin Name	Connector	Pin	I/O
LIGHTING BUS 1 HI	P1001	18	In
LIGHTING BUS 1 LO	P1001	17	In
LIGHTING BUS 2 HI	P1001	61	In
LIGHTING BUS 2 LO	P1001	42	In

The GTN can be configured to track 28 VDC, 14 VDC, 5 VDC or 5 VAC lighting buses using these inputs. Two lighting buses allow for independent control of display and bezel lighting. Alternatively, the GTN can automatically adjust for ambient lighting conditions based on the photocell. Refer to Section 6.6.6 for instructions on configuring the lighting inputs.

5.2.3 Antennas

Pin Name	Connector	I/O
GPS/SBAS ANTENNA	P1006	In
COM ANTENNA	P1007	I/O
NAV ANTENNA	P1008	In

The GPS/SBAS antenna use a TNC coaxial connector on the connector backplate. The COM and NAV antennas use BNC coaxial connectors on the connector backplate. Reference Figure D-5 for splitter/diplexer block diagrams.

5.2.4 Serial Data

5.2.4.1 Serial Data Function

5.2.4.1.1 RS-232

The GTN is capable of interfacing with other aviation instruments by transmitting RS-232 Type 1 and Type 2 data on any RS-232 OUT port. The data consists of the following (refer to Section B.1 for a detailed data format description):

- Current latitude, longitude, and GPS altitude in feet (see Note below)
- Current velocity vector (ground speed and direction of velocity vector over the ground)
- Distance to waypoint
- Cross track error
- Desired track
- Destination waypoint identifier
- Bearing to destination waypoint
- Magnetic variation
- Navigation and warning status
- Waypoint sequence in route
- Waypoint position (latitude and longitude) and magnetic variation

NOTE

Aviation RS-232 data may be transmitted with or without the current GPS altitude in feet. Refer to Appendix B.

The GTN can receive pressure altitude, air data, and fuel data from certain systems on any RS-232 IN port.

5.2.4.1.2 ARINC 429

The data output on the ARINC 429 OUT ports depends on the configuration (see Section 6.6.1). Below is a list of the configurations and the labels output for each one:

1. ARINC 429
2. GAMA Format 1
3. GAMA Format 2
4. GAMA Format 3
5. GAMA Format 4
6. GAMA Format 5
7. GAMA Format 6

Label #	Parameter Name	1	2	3	4	5	6	7
001	Distance to Go (BCD)	●	●	●	●	●	●	●
002	Time to Go (BCD)	●	●	●	●	●	●	●
012	Ground Speed (BCD)	●	●	●	●	●	●	●
074G	Data Record Header		●	●	●	●	●	●
075G	Active Wpt From/To Data		●	●	●	●	●	●
100	Selected Course 1	●						
100P	Selected Course 1		●	●	●	●	●	●
113G	Message Checksum		●	●	●	●	●	●
114	Desired Track (True)	●	●	●	●	●	●	●
115	Waypoint Bearing (True)	●	●	●	●	●	●	●
116	Cross Track Distance	●						
116G [1]	Cross Track Distance		●	●	●	●	●	●
117G	Vertical Deviation		●	●	●	●	●	
117P	Vertical Deviation							●
121	Horizontal Command (to Autopilot)	●	●	●	●	●	●	●
125	Greenwich Mean Time (BCD)	●	●	●	●	●	●	●
147G	Magnetic Variation		●	●	●	●	●	●
251	Distance to Go	●						
251G	Distance to Go		●	●	●	●	●	●
252	Time to Go	●	●	●	●	●	●	●
260G	Date (BCD)		●	●	●	●	●	●
261G	GPS Discrete Word 1		●	●	●	●	●	●
275G	LRN Status Word		●	●	●	●	●	●
300G	Station Declination, Type, and Class		●	●	●	●	●	●
303	Message Length/Type/Number		●	●	●	●	●	●
304G	Message Characters 1-3		●	●	●	●	●	●
305G	Message Characters 4-6		●	●	●	●	●	●
306G	NAV/Waypoint/Airport Latitude		●	●	●	●	●	●
307G	NAV/Waypoint/Airport Longitude		●	●	●	●	●	●
310	Present Position Latitude	●	●	●	●	●	●	●
311	Present Position Longitude	●	●	●	●	●	●	●
312	Ground Speed	●	●	●	●	●	●	●
313	Track Angle (True)	●	●	●	●	●	●	●
314	True Heading	●	●	●	●	●	●	●
315	Wind Speed	●	●	●	●	●	●	●
316	Wind Angle (True)	●	●	●	●	●	●	●
320	Magnetic Heading	●	●	●	●	●	●	●
321	Drift Angle	●	●	●	●	●	●	●

Label #	Parameter Name	1	2	3	4	5	6	7
326G [1]	Lateral Scale Factor		●	●	●	●	●	●
327G	Vertical Scale Factor		●	●	●	●	●	
330	Conic Arc Inbound Course			●	●			
331	Conic Arc Radius			●	●			
332	Conic Arc Course Change Angle			●	●			
333	Airport Runway Azimuth			●	●			
334	Airport Runway Length in Feet			●	●			
335	Left/Right Hand Holding Pattern Azimuth			●	●			
340	Left/Right Hand Procedure Turn Azimuth			●	●			
351G	Distance to Destination (Via Flight Plan)		●	●	●	●	●	●
352G	Estimated Time to Destination (Via Flight Plan)		●	●	●	●	●	●
371G	Specific Equipment ID		●	●	●	●	●	●
377	Equipment Hex ID Code	●	●	●	●	●	●	●

[1] Label 116G and 326G utilize the optional resolution extension bits (bits 11-13).

[2] Labels 074G, 300G, 330, 331, 332, 33, 334, 335, and 340 are dependent upon the flight plan records as defined in the *GAMA Publication No. 11: ARINC 429 General Aviation Subset* and therefore are not transmitted at a periodic rate.

[3] Label 075G for GAMA 429 Pro Line 21 is transmitted immediately after the transmission of label 074 (see Note [1]) and therefore is not transmitted at a periodic rate.

[4] Label 273 will be transmitted only after a GAD 42 configuration change is made on the GAD 42 configuration page.

The following labels are output on the VOR/ILS ARINC 429 OUT port:

Label #	Parameter Name
034G	VOR/ILS Frequency (BCD)
035G	DME Frequency (BCD)
100G	Selected Course #1
173	Localizer Deviation
174	Glideslope Deviation
222	VOR Omnibearing
371G	Specific Equipment ID
377	Equipment Hex ID Code

The labels transmitted from the GTN 750 NAV board are listed below.

Label #	Parameter Name
034G	VOR/ILS Frequency (BCD)
035G	DME Frequency (BCD)
100G	Selected Course #1
173	Localizer Deviation
174	Glideslope Deviation
222	VOR Omnibearing
371G	Specific Equipment ID
377	Equipment Hex ID Code

5.2.4.2 Serial Data Electrical Characteristics

5.2.4.2.1 RS-232

Pin Name	Connector	Pin	I/O
RS-232 OUT 1	P1001	8	Out
RS-232 IN 1	P1001	27	In
RS-232 GND 1	P1001	46	--
RS-232 OUT 2	P1001	7	Out
RS-232 IN 2	P1001	26	In
RS-232 GND 2	P1001	45	--
RS-232 OUT 3	P1001	6	Out
RS-232 IN 3	P1001	25	In
RS-232 GND 3/4	P1001	44	--
RS-232 OUT 4	P1001	5	Out
RS-232 IN 4	P1001	24	In
RS-232 OUT 5	P1005	8	Out
RS-232 IN 5	P1005	29	In
RS-232 GND 5	P1005	49	--
RS-232 OUT 6	P1005	9	Out
RS-232 IN 6	P1005	30	In
RS-232 GND 6	P1005	50	--

RS-232 outputs are compatible with EIA Standard RS-232C with an output voltage swing of at least ±5 V when driving a standard RS-232 load.

5.2.4.2.2 ARINC 429

Pin Name	Connector	Pin	I/O
ARINC 429 OUT 1A	P1001	10	Out
ARINC 429 OUT 1B	P1001	29	Out
ARINC 429 OUT 2A	P1001	9	Out
ARINC 429 OUT 2B	P1001	28	Out
ARINC 429 IN 1A	P1001	48	In
ARINC 429 IN 1B	P1001	67	In
ARINC 429 IN 2A	P1001	47	In
ARINC 429 IN 2B	P1001	66	In
VOR/ILS ARINC 429 OUT A	P1004	24	Out
VOR/ILS ARINC 429 OUT B	P1004	23	Out
VOR/ILS ARINC 429 IN A	P1004	36	In
VOR/ILS ARINC 429 IN B	P1004	35	In
ARINC 429 OUT 3A	P1005	28	Out
ARINC 429 OUT 3B	P1005	7	Out
ARINC 429 IN 3A	P1005	37	In
ARINC 429 IN 3B	P1005	16	In
ARINC 429 IN 4A	P1005	38	In
ARINC 429 IN 4B	P1005	17	In

ARINC 429 outputs conform to ARINC 429 electrical specifications when loaded with up to five standard ARINC 429 receivers.

5.2.5 Ethernet (HSDB)

Pin Name	Connector	Pin	I/O
ETHERNET OUT 1 A	P1002	8	Out
ETHERNET OUT 1 B	P1002	9	Out
ETHERNET IN 1 A	P1002	6	In
ETHERNET IN 1 B	P1002	7	In
ETHERNET OUT 2 A	P1002	17	Out
ETHERNET OUT 2 B	P1002	18	Out
ETHERNET IN 2 A	P1002	15	In
ETHERNET IN 2 B	P1002	16	In
ETHERNET OUT 3 A	P1002	25	Out
ETHERNET OUT 3 B	P1002	26	Out
ETHERNET IN 3 A	P1002	23	In
ETHERNET IN 3 B	P1002	24	In
ETHERNET OUT 4 A	P1002	4	Out
ETHERNET OUT 4 B	P1002	5	Out
ETHERNET IN 4 A	P1002	13	In
ETHERNET IN 4 B	P1002	14	In

The Ethernet-based HSDB (High Speed Data Bus) meets the hardware aspects of IEEE standard 802.3 for 10 base T Ethernet communications.

5.2.6 Main Audio Output

The main audio output is used to play the 'clicks' associated with the touch screen, as well as TAWS alerts on GTN units that are equipped with TAWS.

Pin Name	Connector	Pin	I/O
AUDIO OUT HI	P1001	4	Out
AUDIO OUT LO	P1001	23	Out

The audio output is 60 mW across a 500Ω load.

5.2.7 Main Indicator

5.2.7.1 Main Indicator Function

The main indicator displays both lateral and vertical deviation from selected course, To/From indications, lateral and vertical flags and superflags.

The "CDI" key on the screen of the GTN takes the place of remote "NAV/GPS" switches, and is used to toggle between display of GPS and VOR/ILS navigation on a remote indicator. The navigation source is annunciated on the display below the 'CDI' key. The navigation method is optionally annunciated externally by connecting to the VOR/LOC ANNUNCIATE output (P1001-52) and GPS ANNUNCIATE output (P1001-15). GPS and VOR/ILS navigation may be toggled externally when the CDI SOURCE SELECT input (P1001-39) is momentarily grounded. See Section 5.2.9 and Section 5.2.10 for more information on the discrete inputs and outputs.

An OBS resolver connection to the GPS is preferred, but not required. For the GTN 750, an OBS resolver typically is connected to the MAIN OBS inputs for use with the VOR receiver.

5.2.7.2 Main Indicator Electrical Characteristics

5.2.7.2.1 Deviation

Pin Name	Connector	Pin	I/O
MAIN LATERAL +LEFT OUT	P1001	49	Out
MAIN LATERAL +RIGHT OUT	P1001	68	Out
MAIN VERTICAL +UP OUT	P1001	12	Out
MAIN VERTICAL +DOWN OUT	P1001	31	Out

The deviation output is capable of driving up to three 1000Ω loads with±150 mVDC ±15 mVDC for full-scale deflection, 0 mVDC ±4.5 mVDC when centered. The drive circuit provides for more than full-scale deflection with a maximum course deviation output voltage of ±300 mVDC ±30 mVDC.

5.2.7.2.2 TO/FROM

Pin Name	Connector	Pin	I/O
MAIN +TO OUT	P1001	11	Out
MAIN +FROM OUT	P1001	30	Out

The output is capable of driving up to three 200Ω loads. When indicating TO, MAIN +TO OUT is +225 ±75 mV DC with respect to MAIN +FROM OUT. When indicating FROM, MAIN +TO OUT is -225 ±75 mV DC with respect to MAIN +FROM OUT. When invalid information is present (Flag IN VIEW) the TO/FROM output is 0 ±20 mVDC.

5.2.7.2.3 Flags

Pin Name	Connector	Pin	I/O
MAIN LATERAL +FLAG OUT	P1001	50	Out
MAIN LATERAL -FLAG OUT	P1001	69	Out
MAIN VERTICAL +FLAG OUT	P1001	51	Out
MAIN VERTICAL -FLAG OUT	P1001	70	Out

Flag outputs are capable of driving up to three 1000Ω loads. When valid information is present (Flag OUT OF VIEW) the Flag output is 375 ±80 mV DC. When invalid information is present (Flag IN VIEW) the Flag output is 0 ±25 mVDC.

5.2.7.2.4 Superflags

Pin Name	Connector	Pin	I/O
MAIN LATERAL SUPERFLAG OUT	P1001	13	Out
MAIN VERTICAL SUPERFLAG OUT	P1001	32	Out

The output supplies not less than 320 mA with the output voltage not less than (AIRCRAFT POWER – 2.0 VDC) when the flag is to be OUT OF VIEW. The output is electrically open when the flag is to be IN VIEW.

5.2.8 OBS

Pin Name	Connector	Pin	I/O
MAIN OBS ROTOR C	P1001	2	Out
MAIN OBS ROTOR H (GND)	P1001	1	--
MAIN OBS STATOR D	P1001	21	In
MAIN OBS STATOR E (GND)	P1001	40	--
MAIN OBS STATOR F	P1001	41	In
MAIN OBS STATOR G (GND)	P1001	60	--

MAIN OBS ROTOR C and H (GND) are a buffered output that is intended to drive the OBS rotors. MAIN OBS STATOR D and MAIN OBS STATOR F are each phase and amplitude shifted version of the MAIN ROTOR C output. Each pair is intended to read one of the two windings of the indicator's OBS stator.

5.2.9 Discrete Inputs

Pin Name	Connector	Pin	I/O
OBS MODE SELECT*	P1001	16	In
AUDIO INHIBIT IN*	P1001	36	In
TAWS INHIBIT IN*	P1001	37	In
AIR/GROUND*	P1001	38	In
CDI SOURCE SELECT*	P1001	39	In
DEMO MODE SELECT*	P1002	1	In
SYSTEM ID PROGRAM*	P1002	10	In
SPARE DISC IN D*	P1002	11	In
SYNCHRO VALID INPUT (ACTIVE LO)	P1005	33	In
SYNCHRO VALID INPUT (ACTIVE HI)	P1005	54	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate. If there is no asterisk, the signal is Active-High.

Active-low discrete inputs are considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. These inputs are considered inactive if the voltage to ground is 6.5-33 VDC or the resistance to ground is >100 kΩ.

Active-high discrete inputs are considered active if either the voltage to ground is >6.5 VDC. These inputs are considered inactive if the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω.

5.2.9.1 OBS MODE SELECT*

The OBS MODE SELECT* discrete input may be used to toggle between GPS OBS and GPS AUTO modes of operation. A momentary low on this pin performs the same function as pressing the 'OBS' key on the GTN display.

5.2.9.2 AUDIO INHIBIT IN*

The AUDIO INHIBIT IN* discrete input may be used to suppress TAWS and touchscreen feedback audio from the GTN.

5.2.9.3 TAWS INHIBIT IN*

The TAWS INHIBIT IN* discrete input, when toggled momentarily low, may be used to inhibit TAWS alerts from the GTN.

5.2.9.4 AIR/GROUND*

The AIR/GROUND* discrete is active-low, and can be configured to interpret if the aircraft is airborne or on the ground based upon whether the input is grounded or open.

5.2.9.5 CDI SOURCE SELECT* (GTN 750 only)

The CDI SOURCE SELECT* discrete input may be used to toggle between display of GPS and VOR/LOC/Glideslope information on the MAIN external CDI/HSI. A momentary low on this pin performs the same function as pressing the 'CDI' key on the GTN display.

5.2.9.6 DEMO MODE SELECT*

The DEMO MODE SELECT* discrete input may be used to select Demo Mode on the GTN. When this pin is connected to ground during power up, the GTN starts up in Demo Mode. Demo Mode allows the GTN to simulate reception of GPS satellite signals.

CAUTION

Do not connect DEMO MODE SELECT* in an aircraft installation.

NOTE

Demo Mode can also be accessed by holding down the D→ key during power-up.

5.2.9.7 SYSTEM ID PROGRAM*

The SYSTEM ID PROGRAM* discrete input is used to identify GTN #2 in an installation with more than one GTN. This input must be strapped to ground on the second GTN.

SYSTEM ID PROGRAM*	GTN Installation
Open	GTN #1 or single-GTN installation
Ground	GTN #2

5.2.10 Discrete Outputs

Pin Name	Connector	Pin	I/O
OBS ANNUNCIATE*	P1001	14	Out
GPS ANNUNCIATE*	P1001	15	Out
WAYPOINT ANNUNCIATE*	P1001	33	Out
TERMINAL ANNUNCIATE*	P1001	34	Out
TAWS AUDIO ACTIVE OUT	P1001	35	Out
VOR/LOC ANNUNCIATE*	P1001	52	Out
LOI ANNUNCIATE*	P1001	53	Out
MESSAGE ANNUNCIATE*	P1001	54	Out
APPROACH ANNUNCIATE*	P1001	55	Out
ILS/GPS APPROACH*	P1001	56	Out
TAWS INHIBIT ANNUNCIATE*	P1001	57	Out
TERRAIN WARNING ANNUNCIATE*	P1001	71	Out
TERRAIN NOT AVAILABLE ANNUNCIATE*	P1001	72	Out
TERRAIN CAUTION ANNUNCIATE*	P1001	73	Out
GPS SELECT* [1]	P1001	74	Out
TRAFFIC TEST*	P1001	75	Out
TRAFFIC STANDBY*	P1001	76	Out
SPARE DISC OUT A*	P1002	3	Out
SPARE DISC OUT B*	P1002	12	Out
SPARE OUTPUT C*	P1005	34	Out

[1] The operation of the GPS SELECT can be configured.

An asterisk (*) following a signal name denotes that the signal is Active-Low, producing a low (ground) on the output when active.

All discrete outputs from the GTN are Active-Low. Each is an “open drain” output capable of sinking 500 mA when active.

5.2.10.1 OBS ANNUNCIATE*

The OBS ANNUNCIATE* output is driven to indicate GPS OBS mode of operation. This output is active when the OBS annunciation is on the display.

5.2.10.2 SUSP ANNUNCIATE*

The SUSP ANNUNCIATE* output is driven to indicate GPS suspend mode of operation. This output is active when the SUSP annunciation is on the display.

5.2.10.3 GPS ANNUNCIATE*

The GPS ANNUNCIATE* output is driven when the unit is configured with a single CDI/HSI and the GPS data is being displayed on the CDI/HSI. This output parallels the GPS annunciation on the display.

5.2.10.4 WAYPOINT ANNUNCIATE*

The WAYPOINT ANNUNCIATE* output is driven in the following manner:

1. When the aircraft is within 10 seconds of reaching the turning point for a course change, the waypoint annunciator flashes.
2. When the aircraft is in a turn, the waypoint annunciator illuminates and remains illuminated until the turn is completed.
3. When a user arrival alarm is set and the aircraft is within the circle defined by the arrival alarm radius at the arrival waypoint, the waypoint annunciator flashes for 10 seconds.
4. When a user arrival alarm is not set and the aircraft is within 10 seconds of reaching the arrival waypoint, the waypoint annunciator flashes.

5.2.10.5 TERMINAL ANNUNCIATE*

When performing approach navigation, the TERMINAL ANNUNCIATE* output is active when operating within 30 nautical miles of the departure or arrival airport and the CDI scale is the equivalent or 1.0 nm or less.

5.2.10.6 TAWS AUDIO ACTIVE OUT*

The TAWS AUDIO ACTIVE OUT* is active when the GTN is issuing a TAWS audio alert. This output can be connected to the Audio Inhibit input of other units with audio that is lower priority than TAWS.

5.2.10.7 VOR/LOC ANNUNCIATE* (GTN 750 Only)

The VOR/LOC ANNUNCIATE* output is driven when the unit is configured with a single CDI/HSI and the VOR/ILS data is being displayed on the CDI/HSI. This output parallels the VOR/LOC annunciator on the display.

5.2.10.8 LOI ANNUNCIATE*

The LOI ANNUNCIATE* output is active when the GPS receiver detects a position error, or is unable to calculate the integrity of the position. On the 400W/500W Series navigators, this output is called 'Integrity Annunciate'.

5.2.10.9 MESSAGE ANNUNCIATE*

When a new status message is available, the MESSAGE ANNUNCIATE* output is active and the message annunciator flashes. When status messages remain effective, the message annunciator illuminates continuously.

5.2.10.10 APPROACH ANNUNCIATE*

When performing approach navigation, the APPROACH ANNUNCIATE* output is active while an approach is active.

5.2.10.11 ILS/GPS APPROACH*

The ILS/GPS APPROACH* output is active when:

- GPS navigation is selected and either a GPS approach mode is active or 0.3 nm is selected for the CDI full scale deflection; or
- VOR/LOC navigation is selected and an ILS channel has been selected.

This output may be connected to the ILS Engage input of an autopilot or flight director to provide higher autopilot gain while the GTN is operating in the ILS or GPS Approach modes of operation.

5.2.10.12 TAWS INHIBIT ANNUNCIATE*

The TAWS INHIBIT ANNUNCIATE* is active when TAWS is inhibited on the GTN.

5.2.10.13 TERRAIN WARNING ANNUNCIATE*

The TERRAIN WARNING ANNUNCIATE* is active when a TAWS warning is active on the GTN.

5.2.10.14 TERRAIN NOT AVAILABLE ANNUNCIATE*

The TERRAIN NOT AVAILABLE ANNUNCIATE* is inactive causing the external TAWS N/A annunciator to illuminate.

5.2.10.15 TERRAIN CAUTION ANNUNCIATE*

The TERRAIN CAUTION ANNUNCIATE* is active when a TAWS caution is active on the GTN.

5.2.10.16 GPS SELECT*

The GPS SELECT* discrete output is active when GPS data is being displayed on the CDI/HSI and the ILS/GPS Approach Output is not active. It is intended for use with autopilots having a GPS SELECT input (such as the Bendix/King KAP 140 and KFC 225), so that the autopilot can capture vertical guidance while GPS data is being displayed on the CDI/HSI.

5.2.10.17 TRAFFIC TEST*

The TRAFFIC TEST* discrete output is used to command compatible traffic systems into test mode.

5.2.10.18 TRAFFIC STANDBY*

The TRAFFIC STANDBY* discrete output is used to command compatible traffic systems into standby or operate mode.

5.2.11 TIME MARK OUT

Pin Name	Connector	Pin	I/O
TIME MARK OUT A	P1001	3	Out
TIME MARK OUT B	P1001	22	Out

TIME MARK OUT outputs a differential 1 ms ± 1 μs wide pulse once every second. TIME MARK OUT is a logic level output, capable of sourcing 1 mA at greater than 3.8 V and sinking 1 mA at less than 0.4 V.

5.2.12 Heading Synchro

The GTN accepts heading information using synchro, RS-232, or ARINC 429 inputs. If synchro heading is provided, refer to the paragraphs below.

5.2.12.1 Heading Synchro XYZ

Pin Name	Connector	Pin	I/O
SYNCHRO X	P1005	35	In
SYNCHRO Y	P1005	14	In
SYNCHRO Z	P1005	56	In

Connect these pins to an XYZ type directional gyro.

5.2.12.2 Heading Synchro Reference Voltage

Pin Name	Connector	Pin	I/O
SYNCHRO REF HIGH	P1005	36	In
SYNCHRO REF LO	P1005	15	In

A reference voltage must be provided if the synchro heading input is used. This input should be 26 VAC 400 Hz (nominal) and provided by the same source that provides the excitation voltage to the synchro heading source.

5.2.12.3 Heading Synchro Valid Input

Pin Name	Connector	Pin	I/O
SYNCHRO VALID INPUT (ACTIVE HI)	P1005	54	In
SYNCHRO VALID INPUT*	P1005	33	In

P1005-54 is considered active if the voltage on this input is 6.5-33 VDC. If the voltage is ≤3.5 VDC, the input is considered inactive.

P1005-33 is considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC.

Unless P1005-54 or P1005-33 is active, the GTN will consider the synchro heading input to be invalid.

5.2.13 COM Audio (GTN 750 Only)

5.2.13.1 COM Audio Function

Activation of MIC 1 TRANSMIT enables MIC 1 AUDIO IN HI and causes the transceiver to transmit.

500Ω COM AUDIO is a 100 mW audio output that is intended to drive a headset or an audio panel.

5.2.13.2 COM Audio Electrical Characteristics

5.2.13.2.1 COM MIC AUDIO

Pin Name	Connector	Pin	I/O
COM MIC 1 AUDIO IN HI	P1003	5	In
MIC AUDIO IN LO	P1003	20	In

COM MIC 1 AUDIO IN HI and COM MIC 2 AUDIO IN HI are standard carbon or dynamic mic inputs with integrated preamps providing minimum 70 mVrms into a 1000Ω load.

COM MIC 1 AUDIO IN HI and MIC 2 AUDIO IN HI are set in the factory so that 100 mVrms modulates the transmitter to 85% nominally at 1000 Hz. The microphone gain adjustment is made through Configuration Mode. See Section 6.6.10.

5.2.13.2.2 COM AUDIO

Pin Name	Connector	Pin	I/O
500Ω COM AUDIO HI	P1003	7	Out
500Ω COM AUDIO LO	P1003	18	Out

500Ω COM AUDIO supplies 100 mW into a 500Ω load. This is a balanced output and the LO output must be connected.

500Ω COM AUDIO is the summation of the COM receiver audio, COM sidetone audio, and intercom audio.

5.2.14 COM Discrete Inputs (GTN 750 only)

Pin Name	Connector	Pin	I/O
COM MIC 1 KEY*	P1003	11	In
COM REMOTE TRANSFER*	P1003	27	In
COM REMOTE TUNE UP*	P1003	28	In
COM REMOTE TUNE DOWN*	P1003	29	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate.

These inputs are considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC or the resistance to ground is >100kΩ.

5.2.14.1 COM MIC 1 KEY*

The COM MIC 1 KEY* discrete input, when pulled low, allows the audio that is present on the COM MIC 1 AUDIO IN HI (P1003-5) to be transmitted over the radio.

5.2.14.2 COM REMOTE TRANSFER*

The COM REMOTE TRANSFER* discrete input may be used to flip-flop between the active and standby COM frequencies. A momentary low on this pin will load the standby COM frequency into the active COM frequency field.

The COM REMOTE TRANSFER* input may be used for emergency operation of the COM transmitter. If the switch is depressed for two seconds, the active COM frequency changes to 121.500 MHz. Once the emergency frequency is activated through COM REMOTE TRANSFER*, the GTN transceiver ignores inputs from the front panel controls for COM selections only. The pilot may exit this independent mode—restoring COM selection control to the front panel knobs and keys—by again depressing the switch for two seconds.

5.2.14.3 COM REMOTE TUNE UP*

The COM REMOTE TUNE UP* discrete input may be used to scroll through a list of preset COM frequencies. A momentary low on this pin will load the next preset frequency in the list into the standby COM frequency field.

5.2.14.4 COM REMOTE TUNE DOWN*

The COM REMOTE TUNE DOWN* discrete input may be used to scroll through a list of preset COM frequencies. A momentary low on this pin will load the previous preset frequency in the list into the standby COM frequency field.

5.2.15 VOR/ILS Audio (GTN 750 Only)

Pin Name	Connector	Pin	I/O
500Ω VOR/LOC AUDIO OUT HI	P1004	16	Out
500Ω VOR/LOC AUDIO OUT LO	P1004	17	Out

500Ω VOR/LOC AUDIO OUT HI supplies 100 mW into a 500Ω load. It is a balanced output and the 500Ω VOR/LOC AUDIO OUT LO output must be connected.

5.2.16 VOR/ILS Discrete Inputs (GTN 750 Only)

Pin Name	Connector	Pin	I/O
VOR/LOC REMOTE TRANSFER*	P1004	28	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate.

This input is considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC or the resistance to ground is >100kΩ.

5.2.16.1 VOR/LOC REMOTE TRANSFER

The VOR/LOC REMOTE TRANSFER* discrete input may be used to flip-flop between the active and standby NAV frequencies. A momentary low on this pin will load the standby NAV frequency into the active NAV frequency field.

5.2.17 VOR/ILS Indicator (GTN 750 Only)

5.2.17.1 VOR/ILS Indicator Function

NOTE

Because the GTN 750 includes a “CDI” key that performs switching between GPS and VOR/ILS on a remote indicator, it is seldom necessary to use these outputs to drive an indicator. It is only necessary when it is desired for a separate indicator to display VOR/ILS deviation full-time (regardless of the “CDI” key status).

The VOR/ILS indicator displays both lateral and vertical, To/From indications, lateral and vertical flags and superflags. GTN 750 connector P1004 always outputs the VOR/Localizer/Glideslope navigation information. The VOR/ILS pins on P1004 are used to drive an indicator that displays VOR/ILS information at all times, regardless of the CDI selection on the GTN 750.

VOR/LOC COMPOSITE OUT is a standard VOR/localizer composite output signal which may be used to drive the Left/Right, TO/FROM, and Flag indications of certain navigation indicators that contain an internal converter.

The ILS ENERGIZE output becomes active (low) when the VOR/LOC frequency is set to a localizer channel.

5.2.17.2 VOR/ILS Indicator Electrical Characteristics

5.2.17.2.1 Superflags

Pin Name	Connector	Pin	I/O
VOR/LOC SUPERFLAG	P1004	15	Out
GLIDESLOPE SUPERFLAG	P1004	38	Out

The output supplies not less than 320 mA with the output voltage not less than (AIRCRAFT POWER -2 VDC) when the flag is to be OUT OF VIEW. The output voltage with respect to ground is 0 +/-250 mVDC when the flag is to be IN VIEW.

5.2.17.2.2 Deviation

Pin Name	Connector	Pin	I/O
VOR/LOC +LEFT	P1004	5	Out
VOR/LOC +RIGHT	P1004	6	Out
GLIDESLOPE +UP	P1004	34	Out
GLIDESLOPE +DOWN	P1004	55	Out

The deviation outputs are each capable of driving up to three 1000Ω loads with ±150 mVDC ±15 mVDC for full-scale deflection, 0 mVDC ±4.5 mVDC when centered. The drive circuit provides for more than full-scale deflection with a maximum course deviation output voltage of ±300 mVDC ±30 mVDC.

5.2.17.2.3 TO/FROM

Pin Name	Connector	Pin	I/O
VOR/LOC +TO	P1004	1	Out
VOR/LOC +FROM	P1004	2	Out

The TO/FROM output is capable of driving up to three 200Ω loads. When indicating TO, the output is +225 ±75 mVDC. When indicating FROM, output is -225 ±75 mVDC. When invalid information is present (Flag IN VIEW) the TO/FROM output is 0 ±10 mVDC.

5.2.17.2.4 Flag

Pin Name	Connector	Pin	I/O
VOR/LOC +FLAG	P1004	3	Out
VOR/LOC -FLAG	P1004	4	Out
GLIDESLOPE +FLAG	P1004	32	Out
GLIDESLOPE -FLAG	P1004	53	Out

The Flag output is capable of driving up to three 1000Ω loads. When valid information is present (Flag OUT OF VIEW) the Flag output is 375 ±80 mV DC. When invalid information is present (Flag IN VIEW) the Flag output is 0 ±25 mV DC.

5.2.17.2.5 OBS

Pin Name	Connector	Pin	I/O
VOR OBS ROTOR C	P1004	9	Out
VOR OBS ROTOR H (GND)	P1004	10	--
VOR OBS STATOR D	P1004	13	In
VOR OBS STATOR E (GND)	P1004	11	--
VOR OBS STATOR F	P1004	12	In
VOR OBS STATOR G (GND)	P1004	14	--

VOR OBS ROTOR C and H are a buffered 400 Hz output that is intended to drive the OBS rotors. VOR OBS STATOR D and VOR OBS STATOR F are each phase and amplitude shifted version of the VOR ROTOR C output. Each pair is intended to read one of the two windings of the indicator's OBS stator.

5.2.17.2.6 VOR/LOC COMPOSITE

Pin Name	Connector	Pin	I/O
VOR/LOC COMPOSITE OUT	P1004	8	Out

With a standard VOR test signal applied, VOR/LOC COMPOSITE OUT is 0.5 ± 0.1 Vrms into a 10 kΩ load. With a standard Localizer centering test signal applied, VOR/LOC COMPOSITE OUT is 0.350 ±0.05 Vrms into a 10 kΩ load.

5.2.17.2.7 GLIDESLOPE COMPOSITE

Pin Name	Connector	Pin	I/O
GLIDESLOPE COMPOSITE OUT	P1004	58	Out

With a standard glideslope test signal applied, GLIDESLOPE COMPOSITE OUT is 0.350 ±0.05 Vrms into a 10 kΩ load.

5.2.17.2.8 NAV ILS ENERGIZE

Pin Name	Connector	Pin	I/O
ILS ENERGIZE	P1004	29	Out

The driver output voltage is not more than 1.0 V when sinking 20 mA. The maximum off state leakage current with respect to GND is less than 10 μA.

5.2.18 RMI/OBI (GTN 750 only)

5.2.18.1 RMI/OBI Function

The VOR OBI output provides bearing information from the currently tuned VOR station for Bendix/King Serial OBI devices based upon the GTN 750 VOR receiver. When a localizer channel is tuned on the VOR/LOC window, there is a bit in the data stream set to indicate that a localizer frequency is tuned which stows the needle or drives it to the 3 o'clock position.

5.2.18.2 RMI/OBI Electrical Characteristics

Pin Name	Connector	Pin	I/O
VOR OBI CLOCK	P1004	25	Out
VOR OBI SYNC	P1004	26	Out
VOR OBI DATA	P1004	27	Out

The output driver is active low. The driver output voltage is not more than 1.0 V when sinking 20 mA. The maximum off state leakage current with respect to ground is less than 10 μA.

5.2.19 DME Tuning (GTN 750 only)

5.2.19.1 DME Tuning Function

The GTN 750 can channel a DME based on the tuned VOR/LOC frequency. The GTN 750 outputs 2 of 5, BCD, or Slip parallel DME and King Serial DME channeling format. When DME COMMON is held low, the GTN 750 actively tunes the DME.

5.2.19.2 DME Tuning Electrical Characteristics

5.2.19.2.1 Parallel DME Tuning

Pin Name	Connector	Pin	I/O
PAR DME 100KHZ-A/NAV SERIAL DME HOLD	P1004	37	Out
PAR DME 100KHZ-B	P1004	39	Out
PAR DME 100KHZ-C	P1004	40	Out
PAR DME 100KHZ-D	P1004	42	Out
PAR DME 100KHZ-E	P1004	54	Out
PAR DME 50KHZ	P1004	43	Out
PAR DME 1MHZ-A	P1004	45	Out
PAR DME 1MHZ-B	P1004	46	Out
PAR DME 1MHZ-C	P1004	47	Out
PAR DME 1MHZ-D/NAV SERIAL DME ON	P1004	33	Out
PAR DME 1 MHZ-E	P1004	56	Out
DME COMMON	P1004	41	In

For each of the parallel DME tuning discrete outputs, the driver output voltage is not more than 1.0 V while sinking 20 mA. The maximum off state leakage current with respect to ground is less than 10 μA.

DME COMMON must be pulled low to indicate to the GTN 750 that it is the device channeling the DME.

DME COMMON is considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC.

Pins 37, 40, 41, 42, 43, 45, 47, 33, 54, and 56 are configured for 2 of 5 parallel DME tuning.

5.2.19.2.2 King Serial DME Tuning

Pin Name	Connector	Pin	I/O
SERIAL DME – DATA	P1004	19	Out
SERIAL DME – CLOCK	P1004	18	Out
SERIAL DME- RNAV/CH REQ	P1004	20	In
SERIAL DME - RNAV MODE	P1004	21	In
DME COMMON	P1004	41	In
SERIAL DME – DME REQUEST	P1004	44	I/O

When SERIAL DME – DATA or SERIAL DME – CLOCK is asserted high and driving a 360Ω load, the driver output voltage is not less than 8 V, and when asserted low is not greater than 10 mV.

SERIAL DME – RNAV/CH REQ, SER DME – RNAV MODE, and DME COMMON are considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC.

DME COMMON must be pulled low to indicate to the GTN 650/750 that it is the device channeling the DME.

Pins 18, 19, 20, and 41 are configured for King Serial DME tuning.

6 POST INSTALLATION CONFIGURATION AND CHECKOUT PROCEDURES

6.1 System Configuration Overview

This section contains instructions for configuring the GTN for each installation as well as checks to ensure the system is properly installed and functioning correctly. A summary of the steps required for configuration and checkout of the GTN is as follows:

- Perform the installation checks
- Load software into the GTN
- Configure the GTN for the specific installation
- Perform ground checks to verify the interfaces to external sensors
- Perform the specified flight checks
- Update the aircraft documentation

6.2 Mounting, Wiring, and Power Checks

Verify that all cables are properly secured and shields are connected to the shield block of the connectors. Check the movement of the flight and engine controls to verify there is no interference between the cabling and control systems. Ensure that all wiring is installed as described in Section 3.6.

Prior to powering up the GTN, the wiring harness must be checked for proper connections to the aircraft systems and other avionics equipment. Point to point continuity must be checked to expose any faults such as shorting to ground. Any faults or discrepancies must be corrected before proceeding.

After accomplishing a continuity check, perform power and ground checks to verify proper power distribution to the GTN. Any faults or discrepancies should be corrected at this time. Remove power from the aircraft upon completion of the harness checkout.

The GTN can be installed after completion of the continuity and power checks. The GTN should be installed into the rack and secured appropriately, as described in Section 4.10.1. The GTN must be connected to the wiring harness and antennas.

CAUTION

When 14 VDC or 28 VDC lighting buses are connected to the GTN, connection of the aircraft lighting bus to the incorrect input pins can cause damage to the GTN. Always start this test with the dimming bus at the lowest setting, and slowly increase the brightness. If it is noticed that the LIGHTING level displayed on the GTN does not increase as the lighting is increased in brightness, verify that the wiring is correct before proceeding.

6.3 Connector Engagement Check

Prior to configuration and checkout of the GTN, the connector engagement should be checked as described below:

1. Turn on the avionics master switch (if installed).
2. Place the GTN in the rack and engage the cam mechanism.
3. Turn the Allen screw of the locking cam (located on the lower left side of the unit) slowly clockwise until the GTN just powers on. A T-handle can be used for this, but ensure that the screw is not over-tightened.
4. Count the number of complete revolutions the Allen screw can be turned until it cannot turn any more. Take care not to over-tighten. Three turns is the minimum for proper installation. If fewer than three turns are possible, the mounting rack should be moved aft (toward the pilot) such that the aircraft panel does not obstruct the unit from properly engaging in the rack.

6.4 Configuration Mode Operations

Configuration mode is used to configure the GTN settings for each specific installation. To access configuration mode with the GTN turned off, press and hold the 'Home' key and apply power to the GTN. Release the 'Home' key when the display activates and the Garmin logo appears fully lit on the screen. The first page displayed is the Configuration Mode page. See Figure 6-1. While in configuration mode, pages can be selected by touching the desired key on the display.

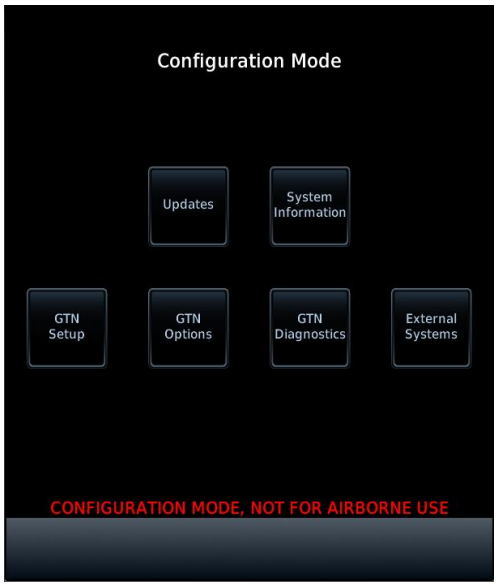


Figure 6-1. Configuration Mode Page

NOTE

The configuration pages shown here reflect main software version 2.00. Some differences in operation may be observed when comparing the information in this manual to later software versions.

6.5 System Information Page

Access the System Information page, as shown in Figure 6-2, by touching the 'System Information' key on the Configuration Mode page, shown in Figure 6-1.

The System Information page displays the unit type, serial number, and system ID for the GTN. It also contains the software and hardware versions of the Main, I/O, Display, Keypad, LED, GPS/WAAS, COM and NAV boards. This information is also available for and certain other LRUs connected to the GTN. Touch the GTN key and choose which LRU to display. Touch UP or DOWN to view all the information.

Figure 6-2. System Information Page

6.6 GTN Setup Page

The following sections describe pages that are accessed from the GTN Setup page, as shown in Figure 6-3. To access the GTN Setup page, touch the 'GTN Setup' key from the Configuration Mode page as shown in Figure 6-1.

Figure 6-3. GTN Setup Page

6.6.1 ARINC 429 Configuration Page

Access the ARINC 429 Configuration page, as shown in Figure 6-4, by touching the 'ARINC 429' key on the GTN Setup page. This page configures the four ARINC 429 input ports and the three ARINC 429 output ports. Select the correct speed for each port depending upon the installed interfaced equipment by touching the speed key and toggling the high or low selection.

Select the correct Data In and Data Out settings for each port. Touch the 'UP' or 'DOWN' key to scroll through the ARINC selections. The data selections are described below.

Figure 6-4. ARINC 429 Configuration Page

SPEED SELECTIONS

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 Kb per second)
High	High-speed ARINC 429 (nominally 100 Kb per second)

DATA IN SELECTIONS

GTN Selection	GNS Equivalent	Description
Off	**Off**	No unit connected to this ARINC 429 input.
Airdata	**Airdata**	Altitude, temperature, and airspeed information from the following Air Data systems: *B & D 2600, 2601, 2800, 90004-003* *Bendix/King KAD 280/480, Shadin ADC 2000*
Airdata/AHRS	**Airdata/AHRS**	Heading, altitude, and airspeed information from an Air Data/AHRS system.
Data Concentrator	**Garmin GTX 330**	This is a Garmin data concentration format. Only high speed ARINC 429 should be used.
EFIS Format 1	**EFIS**	Selected course and heading information from the following EFIS systems: *Bendix/King EFS 40/50* *Certain versions of Collins EFIS may also be compatible with this format.*
EFIS Format 2	**EFIS/Airdata**	Selected course, heading, altitude, temperature, and airspeed information from the following systems: *Collins Pro Line 21* *Bendix/King EFS 40/50 (with SW 1201 or later)*
EFIS Format 3	**Honeywell EFIS**	Selected course, heading, and joystick waypoint information from the following EFIS systems: *Honeywell Primus 1000*
EFIS Format 4	**Sandel EHSI**	Selected course and heading information from the following EHSI system: *Sandel SN3308 and Sandel SN3500*
GAD Format 1	**Garmin GAD 42**	Selected course, heading, and true airspeed data from the Garmin GAD 42.
GDU Format 1	**Garmin GDU**	Selected course, heading, and true airspeed data from the Garmin GDU 620.
INS/IRU	**INS/IRU**	Heading information from the following inertial systems: *Bendix/King KAH 460* *Collins AHC 85* *Honeywell Laseref* *Litef LTR 81* *Litton LTN 90-100, LTN 91, LTN 92*
Traffic Format 1	**Traffic Advisory**	Traffic information from the Garmin GTS 800 traffic system.
Traffic Format 2	**Traffic Advisory**	Traffic information from the Garmin GTS 820 and GTS 850 traffic system.
Traffic Format 3	**Traffic Advisory**	Traffic information from SKY899 traffic system.
Traffic Format 4	**Traffic Advisory**	Traffic information from Bendix/King KTA-870, KMH880 systems.
Traffic Format 5	**Traffic Advisory**	Traffic information from the Avidyne TAS systems.
Traffic Format 6	**Traffic Advisory**	Traffic information from L3 Communications SKY497 SkyWatch.

DATA OUT SELECTIONS

GTN Selection	GNS Equivalent	Description
Off	**Off**	No unit(s) connected to ARINC 429 output
ARINC 429	**ARINC 429**	Standard ARINC 429 output data (non-GAMA).
GAMA Format 1	**GAMA 429**	ARINC 429 data as defined by the *General Aviation Manufacturers' Association (GAMA) General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information to the following systems: *Garmin GDU 620* *Garmin GAD 42 Interface Adapter* *Bendix/King EFS 40/50* (No GPS vertical guidance provided) *Collins EFIS 84* Certain other versions of Collins EFIS may also be compatible with this format.
GAMA Format 2	**GAMA 429 Graphics**	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition* including GAMA Graphics Protocol 'A'. This format outputs intersection symbols as generic waypoint symbols. The output data includes navigation and flight plan information (including graphical representation of flight plan procedures) to the following EFIS systems: *Honeywell Primus 1000*
GAMA Format 3	**GAMA 429 Graphics w/Int**	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition* including GAMA Graphics Protocol 'A'. The output data includes navigation and flight plan information (including graphical representation of flight plan procedures) to the following systems: *Sandel SN3308 and Sandel SN3500*
GAMA Format 4	**GAMA 429 Pro Line 21**	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information to the following EFIS systems: *Collins Pro Line 21*.
GAMA Format 5	**GAMA 429 Sextant**	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information to the following EFIS systems: *Sextant SMD 45*
GAMA Format 6	**GAMA 429 Bendix King**	ARINC 429 data as defined by the GAMA *General Aviation Subset, 2nd Edition.* The output data includes navigation, flight plan and GPS vertical guidance information to the following systems: *Bendix/King EFS 40/50* (GPS vertical guidance provided on EFIS)

NOTE

Only one ARINC 429 output port can be configured to a GAMA Format output at one time. If more than one interfaced system requires a GAMA Format output, splice the GAMA 429 output wires from the GTN into each system requiring GAMA Format information.

SDI

GTN Selection	Description
Common	RX: Accepts all 429 inputs TX: Generates all 429 outputs with SDI = 0.
LNAV 1	Number 1 (Pilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 1. TX: Generates all 429 outputs with SDI = 1.
LNAV 2	Number 2 (Copilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 2. TX: Generates all 429 outputs with SDI = 2.

6.6.2 RS-232 Configuration Page

Access the RS-232 Configuration page, as shown in Figure 6-5, by touching the 'RS-232 key' on the GTN Setup page. Change the inputs or outputs to match the equipment that is installed in the aircraft. Touch the key corresponding to the RS-232 channel and select the applicable input or output setting. The input/output settings are described below. Touch the 'UP' or 'DOWN' key to scroll through the RS-232 selections.

Figure 6-5. Main RS-232 Configuration Page

CHANNEL INPUT SELECTIONS

GTN Selection	GNS Equivalent	Description
Off	**Off**	No unit(s) connected to input of this channel.
Airdata Format 1	**Shadin-adc**	Serial air data information from the following units: *Shadin ADC 200, 200+, 2000.*
Altitude Format 1	**Icarus-alt**	Serial altitude data from the following units: *Icarus Instruments 3000* *Sandia SAE5-35* *Garmin GTX 327 Transponder* *Trans-Cal Industries IA-RS232-X, SSD120* *ACK Technologies A-30 (Mod 8 and above)*
Altitude Format 3	**Shadin-alt**	Serial altitude data from the following units: *Shadin 8800T, 9000T, 9200T*
FADC Format 1	**Shadin-fadc**	Serial air data and fuel flow information from the following units: *Shadin 9628XX-X Fuel/Air Data Computer* *INSIGHT TAS 1000 Air Data Computer*
Fuel Format 1	**Arnav/ei-fuel**	Serial fuel flow information from the following units: *ARNAV FC-10, FT-10* *Electronics International FP-5L*
Fuel Format 2	**Shadin-fuel**	Serial fuel flow information from the following units: *Shadin 91053XM Digital Fuel Management System* *Shadin 91204XM Digital Fuel Management System* *JP Instruments EDM-700 or EDM-760 Engine Monitor*

GTN Selection	GNS Equivalent	Description
GMA Format 1	**N/A**	This input format supports the GMA 35 audio panel interface.
GTX Mode C #1	**N/A**	Select this format for the GTX 32 transponder #1. Provides status data, altitude data, and flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
GTX Mode C #2	**N/A**	Select this format for the GTX 32 transponder #2. Provides status data, altitude data, and flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
GTX Mode S #1	**N/A**	Select this format for the GTX 33/33ES transponder #1. Provides status data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
GTX Mode S #2	**N/A**	Select this format for the GTX 33/33ES transponder #2. Provides status data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
GTX w/TIS #1	**N/A**	Select this format for the GTX 33/33ES transponder #1. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
GTX w/TIS #2	**N/A**	Select this format for the GTX 33/33ES transponder #2. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.
Lightning Detector 1	**WX-500**	Lightning strike information from an L3 Communications WX-500 Stormscope.
Panel GTX w/TIS #1	**N/A**	Select this format for the GTX 330/330ES transponder #1. This provides TIS data from the panel mount GTX 330/330ES transponder.
Panel GTX w/TIS #2	**N/A**	Select this format for the GTX 330/330ES transponder #2. This provides TIS data from the panel mount GTX 330/330ES transponder.

CHANNEL OUTPUT SELECTIONS

GTN Selection	GNS Equivalent	Description
Off	**Off**	No unit(s) connected to output of this channel.
ADS-B	**ADS-B**	Serial communication to Garmin GTX 33/330 ES or 33D/330D ES Transponders.
Aviation Output 1	**Aviation**	Serial position, altitude, velocity, and navigation data to the following units: *Argus 3000, 5000, or 7000 Moving Map* *Electronics International FP-5L Fuel Flow Computer (non-TSO'd)* *Garmin MX20 (V5.6 or later), GMX 200* [1] *Garmin GPSMAP 195, GPSMAP 295 or GPS III Pilot* *Garmin GPSMAP 196, GPSMAP 296, and GPSMAP 396, GPSMAP 496, GPSMAP 695, GPS MAP 696* *Garmin GTX 327 Transponder* *JP Instruments EDM-700 or EDM-760 Engine Monitor* *Shadin 91204XM Digital Fuel Management System* *Shadin 91053XM Digital Fuel Management System* *Shadin 9628XX-X Fuel/Air Data Computer* *Stormscope Series II (with NAVAID) Moving Map*
Aviation Output 2	**Aviation no alt**	Serial position, velocity, and navigation data to the following units: *Garmin MX20 (V5.5 or earlier)* *Horizon DDMP* *INSIGHT TAS 1000 Air Data Computer*
External EGPWS	**HW EGPWS**	Serial communication to a Bendix/King (Honeywell) KGP 560 EGPWS.
GMA Format 1	**N/A**	Control of GMA 35 Audio Panel functions.
GTX Mode C #1	**N/A**	Control of GTX 32 #1 transponder functions, pressure altitude data, and groundspeed data.
GTX Mode C #2	**N/A**	Control of GTX 32 #2 transponder functions, pressure altitude data, and groundspeed data.
GTX Mode S #1	**N/A**	Control of GTX 33 #1 transponder functions, pressure altitude data, and groundspeed data,
GTX Mode S #2	**N/A**	Control of GTX 33 #2 transponder functions, pressure altitude data, and groundspeed data.
GTX w/TIS #1	**N/A**	Control of GTX 33 #1 transponder functions, pressure altitude data, groundspeed data, and TIS traffic.
GTX w/TIS #2	**N/A**	Control of GTX 33 #2 transponder functions, pressure altitude data, groundspeed data, and TIS traffic.
Lightning Detector 1	**WX-500**	Serial communication to an L3 Communications WX-500 Stormscope.
MapMX	**MapMX**	Serial position, altitude, velocity, and navigation data.
Panel GTX w/TIS #1	**N/A**	Select this format for the GTX 330/330ES transponder #1. This provides ground speed, GPS PVT, and pressure altitude information to the transponder.
Panel GTX w/TIS #2	**N/A**	Select this format for the GTX 330/330ES transponder #2. This provides ground speed, GPS PVT, and pressure altitude information to the transponder.

6.6.3 HSDB (Ethernet) Configuration Page

Access the HSDB Ethernet page, as shown in Figure 6-6, by touching the 'HDSB (Ethernet)' key on the GTN Setup page. Touch the key next to the port to configure it as 'Connected' or 'Not Connected'. If a Garmin LRU is connected to a specific Ethernet port, then configure the port as 'Connected'. If no LRU is connected to the port, configure it as 'Not Connected'.

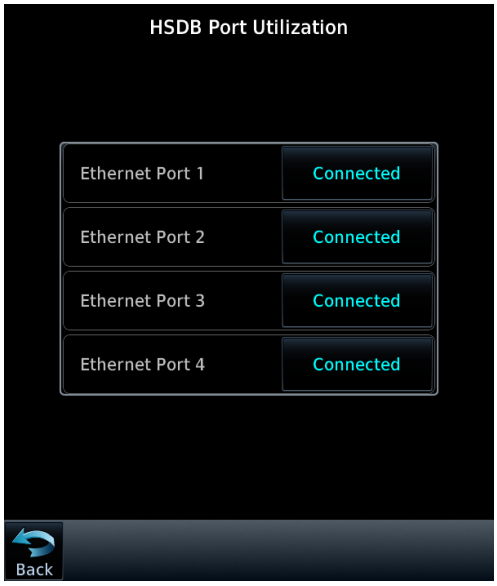


Figure 6-6. HSDB Ethernet Port Configuration Page

6.6.4 Interfaced Equipment Page

Access the Interfaced Equipment page, as shown in Figure 6-7, by touching the 'Interface Equipment' key on the GTN Setup page. This page allows the configuration of the presence of a cross-side navigator, GDL 69/69A, Transponder #1 and Transponder #2.

Figure 6-7. Interfaced Equipment Page

6.6.5 Main Indicator (Analog) Configuration Page

Access the Main Indicator (Analog) Configuration page, as shown in Figure 6-8, by touching the 'Main Indicator (Analog)' key on the GTN Setup page. This page allows you to calibrate the OBS resolver, enable the CDI key, selected course for GPS and/or VOR/LOC, and configure the V-Flag state. The following fields can be configured:

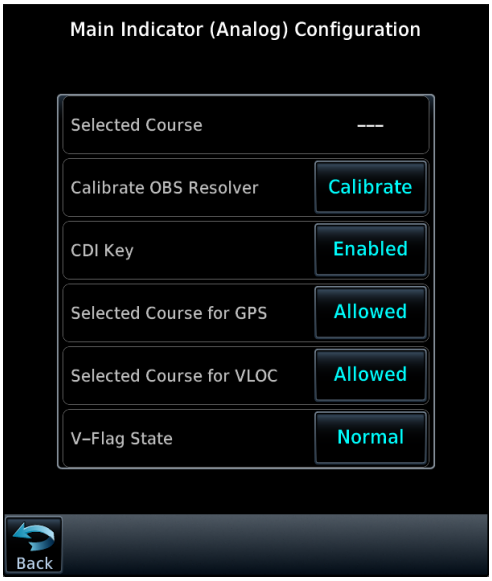


Figure 6-8. Main Indicator (Analog) Configuration Page

CALIBRATE OBS RESOLVER

To calibrate the OBS resolver, touch the 'Calibrate' key on the Main CDI Configuration page, as shown in Figure 6-8. Next, select 150° on the OBS, then touch the OK key, as prompted on the display. After the OBS resolver is finished calibrating, the GTN will display 'OBS Resolver Calibration Complete'. Touch 'OK' after the calibration is complete. Verify OBS operation by checking that the course displayed on the GTN is within 2° of the selected course.

CDI KEY

If it is desired to disable the CDI key, touch the key to the right of 'CDI Key' to toggle between enabling and disabling the CDI key. Disabling the CDI key removes the CDI key from the screen and sets the CDI/VDI outputs always to GPS. This may be necessary for certain EFIS systems where navigation sensor selection must be accomplished on the EFIS or its control panel.

SELECTED COURSE FOR GPS

If it is desired to ignore a selected course input for GPS operation in OBS mode, touch the key to the right of 'Selected Course for GPS' until 'Ignored' is displayed on the key.

SELECTED COURSE FOR VOR/LOC

If it is desired to ignore a selected course input such that the VOR valid flag is dependent only on a valid VOR signal, with lateral deviation calculated by another display device, touch the key to the right of 'Selected Course for VOR/LOC' until 'Ignored' is displayed on the key.

V-FLAG STATE

Select either Normal or Declutter for the V-Flag State by touching the key until the desired selection is displayed on the key.

Selection	Description
Declutter	Whenever vertical deviation is invalid, the vertical deviation bar is parked in the maximum UP position and the vertical flag is removed from view, except in the following cases: (i) the CDI is in VOR/LOC mode and an ILS frequency is tuned, or (ii) the CDI is in GPS mode and a GPS approach with vertical guidance is active. In these cases, whenever the vertical deviation is invalid, the vertical deviation bar parks in the centered position and the vertical flag is shown.
Normal	Whenever vertical deviation is invalid the vertical deviation bar parks in the centered position and the vertical flag is shown.

6.6.6 Lighting Configuration Page

Access the Lighting Configuration page, as shown in Figure 6-9, by touching the 'Lighting' key on the GTN Setup page. This page allows you to set display parameters that affect the display backlight and key lighting brightness.

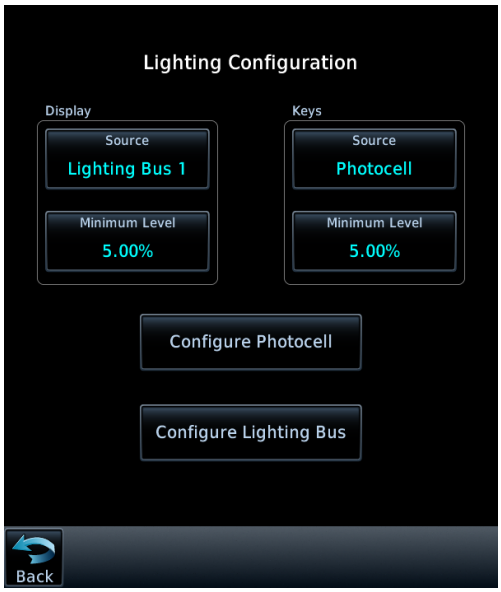


Figure 6-9. Lighting Configuration Page

The Display and Key lighting characteristics are adjusted separately, each with the following fields:

SOURCE

Selection	Description
Photocell	Backlight or key lighting level is determined by the ambient light level as measured by the photocell on the GTN.
Lighting Bus 1	Backlight or key levels track the Lighting Bus 1 levels.
Lighting Bus 2	Key lighting levels track the Lighting Bus 2 levels.

Note that the display source can only be configured to track the photocell or lighting bus 1. If the aircraft has a single lighting bus, display and key brightness can be set to track Lighting Bus 1.

MINIMUM LEVEL

This sets the minimum brightness of the keys or display, whichever is applicable. Touch the 'Minimum Level' key corresponding to either the Keys or the Display to adjust the minimum brightness. The minimum brightness level for the display can be adjusted in a range from 0.14% to 100.00%, with 100.00% being the highest brightness level. The minimum brightness level for the keys can be adjusted in a range from 0.00% to 100.00%, with 100.00% being the highest brightness level. The display and key brightness default level is set to 5.00% at the factory. Enter the desired minimum value on the keypad and then touch the 'Enter' key to store the settings.

6.6.6.1 Configure Photocell Page

Access the Photocell Configuration page, as shown in Figure 6-10, by touching the 'Configure Photocell' key from the Lighting Configuration page. The following parameters can be configured by touching the corresponding key. Each selection displays a numeric keypad where the numeric values can be entered.

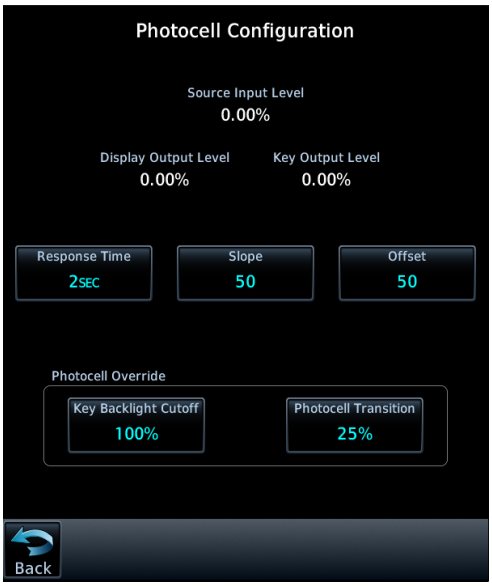


Figure 6-10. Photocell Configuration Page

RESPONSE TIME

Sets the speed with which the brightness responds to the input level (bus voltage or ambient light) changes. The higher the number the slower the display responds. This field has a range of 2-7 seconds, and is set to 2 seconds as a default value.

SLOPE

Sets the sensitivity the brightness of the display has to changes in the input level. The higher the number, the brighter the display for a given increase in the input level. This field has a range of 0-100, and is set to 50 as the default setting.

OFFSET

Adjusts the lighting level up or down for any given input level. This field has a range of 0 (zero) to 99, and is set to 50. At 50, there is no offset. This may also be used to match lighting curves with other equipment in the panel.

KEY BACKLIGHT CUTOFF

This parameter configures the point at which key backlighting is switched off in bright light. For example, a value of 70% means that the key backlights will be off at photocell source input levels above 70%. This field has a range of 0 (zero) to 100% and is set to 80% as the default setting.

PHOTOCELL TRANSITION

When a lighting bus is used to control the lighting of the display, this parameter sets the point on the lighting bus control below which the display brightness tracks the GTN's photocell. This field has a range of 0 (zero) to 50, and is set to 25 as the default setting.

6.6.6.2 Configure Lighting Bus Page

The Lighting Bus Configuration page, as shown in Figure 6-11, offers the same Response Time, Slope, and Offset adjustments as described in Section 6.6.6.1.

LIGHTING BUS SOURCE

To configure the lighting bus source voltage, touch the 'Lighting Bus 1' or 'Lighting Bus 2' key. Select 14V DC, 28V DC, 5V DC, or 5V AC depending on the lighting bus voltage source.

Figure 6-11. Lighting Bus Configuration Page

6.6.7 Audio Configuration Page

Access the Audio Configuration page, as shown in Figure 6-12, by touching the 'Audio' key on the GTN Setup page. The Audio Configuration page allows the adjustment of volume alerts. To adjust the alert volume, press the left arrow to decrease the volume and the right arrow to increase the volume. The volume is displayed as a percentage of maximum volume, with 0% being muted and 100% being max volume. The selected volume level can be checked by selecting 'Test Sound' and then touching the white triangle to the right of the key to hear the test sound. There are three selections available: Altitude, Terrain, and Test Tone.

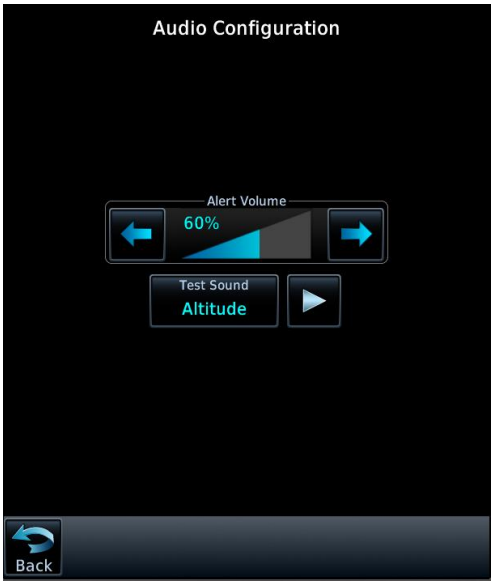


Figure 6-12. Audio Configuration Page

6.6.8 Traffic Configuration Page

Access the Traffic Configuration page, as shown in Figure 6-13, by touching the 'Traffic' key on the GTN Setup page.

Configure the GTN control of the traffic system. If the GTN is used to control the traffic system, touch the key and select 'Yes'. If a separate display device is used to control the traffic system, select 'No'.

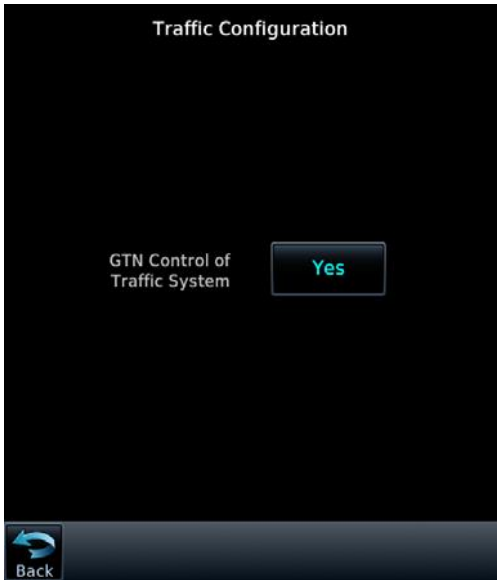


Figure 6-13. Traffic Configuration Page

6.6.9 Main System Configuration Page

Access the Main System Configuration page, as shown in Figure 6-14, by touching the 'Main System' key on the GTN Setup page. This page displays miscellaneous configuration options.

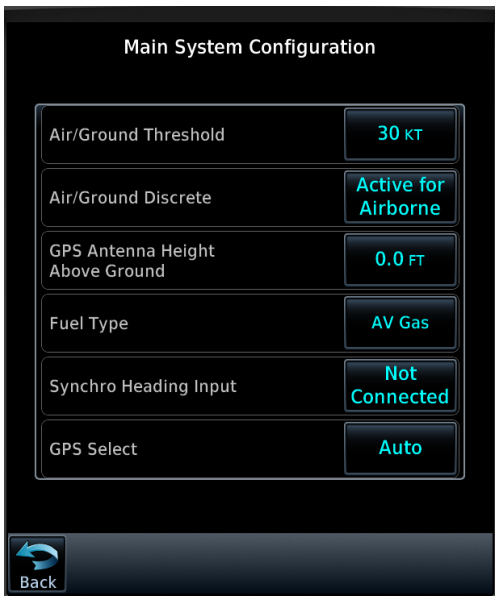


Figure 6-14. Main System Configuration Page

AIR/GROUND THRESHOLD

The air/ground threshold is the groundspeed at which the GTN transitions from a ground state to an airborne state, and vice versa. To adjust the air/ground threshold, touch the key to the right and enter a value. This field has a range of 0 (zero) to 99 knots and is set to 30 knots as a default value.

AIR/GROUND DISCRETE

The AIR/GROUND discrete is active-low, and can be configured to interpret if the aircraft is airborne or on the ground based upon whether the input is grounded or open. If it is desired for the air/ground state to be airborne when the squat switch input is grounded, then toggle the AIR/GROUND discrete key to 'Active for Airborne'. If it is desired for the air/ground state to be airborne when the squat switch input is open, then toggle the AIR/GROUND discrete key to 'Active for Ground'. The default configuration is Active for Airborne. See the table below.

AIR/GROUND Discrete Configuration	AIR/GROUND Input State	GTN Air/Ground Status
Configured **Active for Ground**	Open	Airborne
	Grounded	On-Ground
Configured **Active for Airborne**	Open	On-Ground
	Grounded	Airborne

GPS ANTENNA HEIGHT ABOVE GROUND

This setting configures the height of the GPS antenna above ground level while the aircraft is sitting on the ground. Before proceeding, measure the GPS antenna vertical offset (to the nearest tenth of a foot) as shown in Figure 6-15. Enter the measured value by touching the key and entering the measured value into the keypad on the display. This field has a range of 0.0 to 99.9 feet.

FUEL TYPE

This setting configures the type of fuel the aircraft uses. Options are AV Gas, Jet A, or Jet B.

SYNCHRO HEADING INPUT

This setting configures the GTN as connected to a synchro heading source.

GPS SELECT

When in GPS mode, the GPS Select discrete is unasserted (open) whenever a GPS approach mode is active **and** the pilot has enabled the A/P APR Outputs (an associated message is displayed telling the pilot to enable the A/P APR Outputs). This setting will not allow the pilot to select automatic GPS to ILS CDI transitions on the System Setup page (only manual transitions are permitted).

Selection	Description
Auto	When in GPS mode, the GPS Select discrete is unasserted (open) whenever a GPS approach mode is active – no associated messages appear and no pilot action is required. The pilot is also allowed to select automatic or manual GPS to ILS CDI transitions on the System Setup page.
Prompt	When in GPS mode, the GPS Select discrete is unasserted (open) whenever a GPS approach mode is active **and** the pilot has enabled the A/P APR Outputs (an associated message is displayed telling the pilot to enable the A/P APR Outputs). This setting will not allow the pilot to select automatic GPS to ILS CDI transitions on the System Setup page (only manual transitions are permitted). *For Honeywell (Bendix/King) KFC 225 and KAP 140 autopilots.*

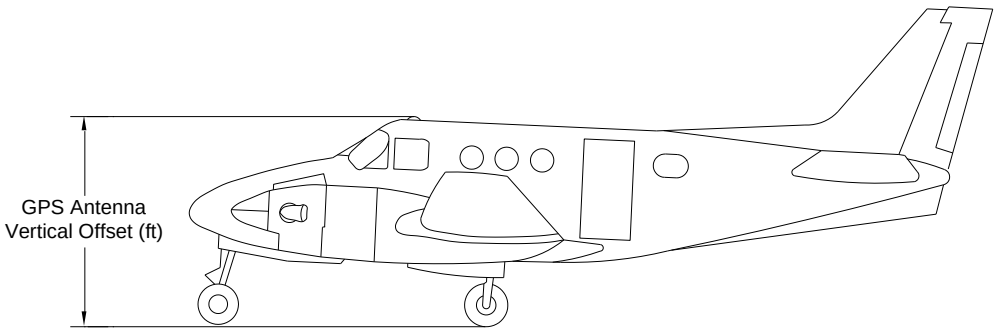


Figure 6-15. Measurement of GPS Antenna Vertical Offset

6.6.10 COM Configuration Page (GTN 750 Only)

Access the COM Configuration page, as shown in Figure 6-16, by touching the 'COM' key from the GTN Setup page. These values are set at the factory and rarely require calibration. To enable or disable the COM radio, touch the key to toggle between 'Enabled' and 'Disabled'. The COM radio defaults to enabled state.

Figure 6-16. COM Configuration Page

COM RF SQUELCH

This setting configures the RF squelch threshold for the COM radio. The default setting is 0%. 0% is the most sensitive (i.e. the weakest signal level necessary to break squelch). Increasing the value will require a stronger signal to break squelch.

MIC 1 GAIN

This can be adjusted to -12 dB, -6 dB, 0 dB, +6 dB, +12 dB, +18 dB, +24 dB, or +30 dB. The default value is +12 dB.

SIDETONE VOLUME

This parameter sets the audio sidetone output level. This value may be set to values between 0.0 dB and 63.0 dB in 0.5 dB increments. The default is 17.5 dB.

6.6.11 VOR/LOC/GS Configuration Page (750 Only)

Access the VOR/LOC/GS Configuration page, as shown in Figure 6-17, by touching the 'VOR/LOC/GS' key from the GTN Setup page. This page allows you to verify and calibrate the CDI outputs from the VOR/LOC/GS receiver as well as the OBS resolver input to the VOR receiver. It also allows you to select the format for the DME tuning data.

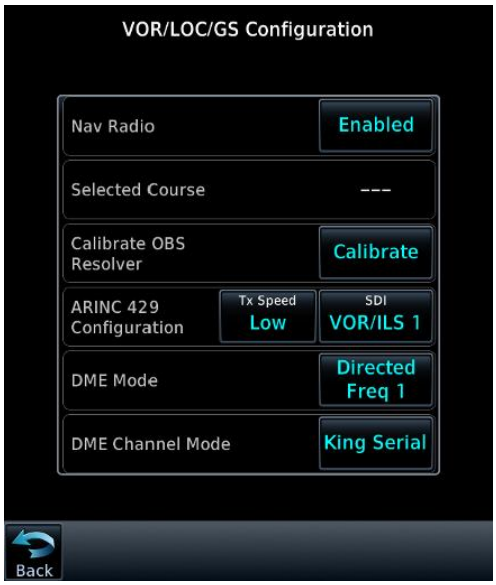


Figure 6-17. VOR/LOC/GS Configuration Page

ENABLE/DISABLE NAV RADIO

To enable or disable the NAV radio, touch the key to toggle between 'Enabled' and 'Disabled'. The NAV radio defaults to enabled state.

CALIBRATE OBS RESOLVER

To calibrate the OBS resolver, touch the 'Calibrate' key on the VOR/LOC/GS Configuration page, as shown in Figure 6-17. Next, select 150˚ on the OBS, then touch the OK key, as prompted on the display. After the OBS resolver is finished calibrating, the GTN will display 'OBS Resolver Calibration Complete'. Touch 'OK' after the calibration is complete. Verify OBS operation by checking that the course displayed on the GTN is within 2° of the selected course.

ARINC 429 CONFIGURATION SPEED (RX AND TX)

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 kilobits per second)
High	High-speed ARINC 429 (nominally 100 kilobits per second)

SDI

Selection	Description
Common	TX: Generates all 429 outputs with SDI = 0.
VOR/ILS 1	# 1 (Pilot) VOR/ILS Receiver TX: Generates all 429 outputs with SDI = 1.
VOR/ILS 2	# 2 (Copilot) VOR/ILS Receiver TX: Generates all 429 outputs with SDI = 2.

DME MODE

Selection	Description
Directed freq 1	If the GTN is connected to a multi-channel ARINC 429 DME, channel 1 of that DME is tuned. "Directed freq 1" should be selected if a single-channel ARINC 429 DME is to be tuned.
Directed freq 2	If the GTN is connected to a multi-channel ARINC 429 DME, channel 2 of that DME is tuned.

DME CHANNEL MODE

This configuration setting allows you to set the format for DME tuning data output.

Selection	Description
King serial	King Serial DME tuning data
Parallel 2x5	2 of 5 parallel DME tuning.
Parallel BCD	Shifted BCD (Binary Coded Decimal) parallel DME tuning
Parallel slip	Slip-code parallel DME tuning
Narco 890/891	2 of 5 parallel DME tuning, compatible with the following DME units: *Narco DME 890* *Narco DME 891* *ARC (Cessna)*

6.7 GTN Options Page

The following sections describe pages that are accessed from the GTN Options page, as shown in Figure 6-18. To access the GTN Options page, touch the 'GTN Options' key from the Configuration Mode page as shown in Figure 6-1.

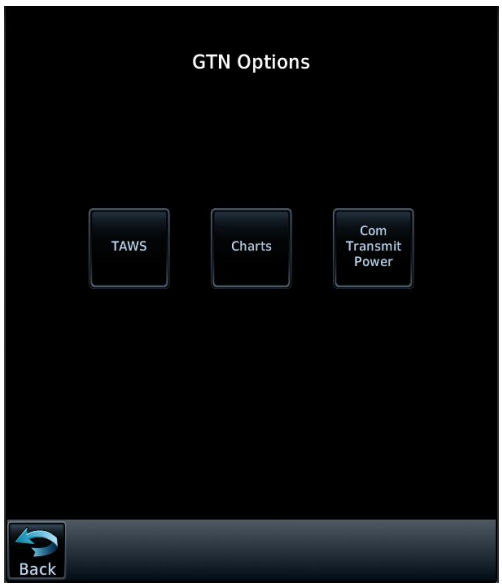


Figure 6-18. GTN Options Page

6.7.1 TAWS Configuration Page (For TAWS Units Only)

TAWS CONFIGURATION

Access the TAWS Configuration page, as shown in Figure 6-19, by touching the 'TAWS' key on the GTN Options page. This page allows you to select the TAWS configuration, configure the TAWS audio, and select the airport criteria.

When the optional TAWS feature is enabled, the GTN will provide Class B TAWS functionality. This section describes how to activate the TAWS feature in the GTN.

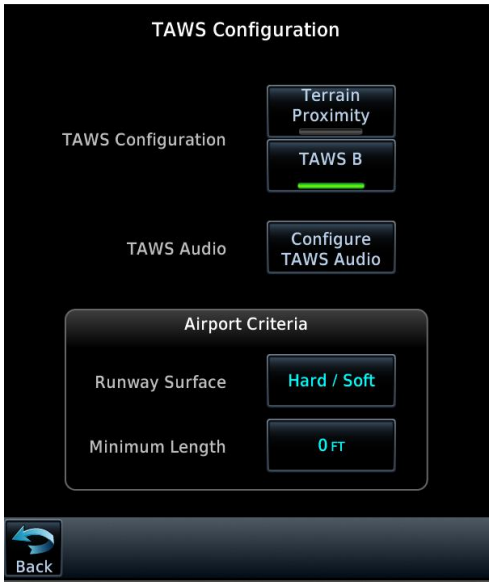


Figure 6-19. TAWS Configuration Page

NOTE

If enabling TAWS on the GTN, the audio output from the GTN must be connected to an unswitched and unmuted input on the audio panel. Turn off the GTN prior to the following steps.

1. Remove the database SD card from the SD card slot and insert a TAWS Enablement Card P/N 010-00878-01.
2. Enter configuration mode by applying power (closing the circuit breaker) to the GTN while holding the HOME key.
3. Go to the TAWS page from the GTN Options page. Touch the 'TAWS B' key next to 'TAWS Configuration.
4. A window will appear with 'Enable TAWS-B? This will consume a feature unlock key when selected.' Touch Yes to enable TAWS-B.
5. When the TAWS feature is activated, the TAWS B key will be lit green as shown in Figure 6-19.

TAWS AUDIO

Access the Configure TAWS Audio page, as shown in Figure 6-20, by touching the 'Configure TAWS Audio' key on the TAWS Configuration page as shown in Figure 6-19. Select which message is heard for cautions and warnings.

Description	Selections
NCR Caution	"Don't Sink" "Too Low Terrain"
EDR Caution	"Sink Rate"
PDA Caution	"Too Low Terrain"
IOI Caution	"Obstacle Ahead" x2 "Caution Obstacle" x2
ROC Caution	"Obstacle Ahead" x2 "Caution Obstacle" x2
ITI Caution	"Terrain Ahead" x2 "Caution Terrain" x2
RTC Caution	"Terrain Ahead" x2 "Caution Terrain" x2
IOI Warning	"Obstacle Ahead Pull Up" x2 "Obstacle" x2 "Pull Up" x2
ROC Warning	"Obstacle Ahead Pull Up" x2 "Obstacle" x2 "Pull Up" x2
ITI Warning	"Terrain Ahead Pull Up" x2 "Terrain" x2 "Pull Up" x2
RTC Warning	"Terrain Ahead Pull Up" x2 "Terrain" x2 "Pull Up" x2
EDR Warning	"Pull Up"
VCO Caution	"Five Hundred"

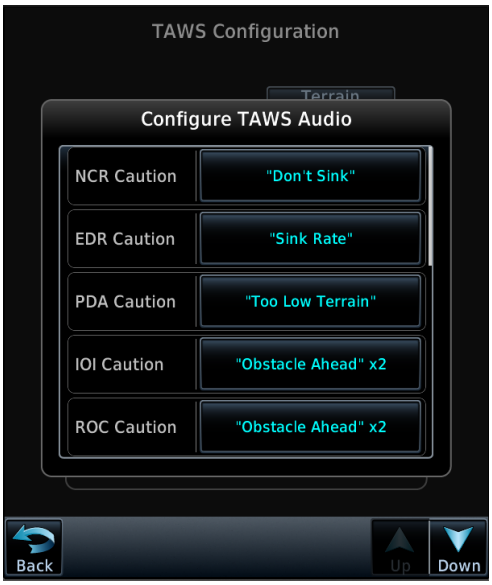


Figure 6-20. Configure TAWS Audio Page

AIRPORT CRITERIA

Configure TAWS airport criteria from the TAWS Configuration page, as shown in Figure 6-19. Select the applicable runway surface type. The selections are Any, Hard Only, Hard/Soft, and Water.

Enter the minimum runway length by touching the distance key using the keypad. The range is 0 to 25,000 ft.

6.7.2 Chart Configuration Page

Access the Charts Configuration page, as shown in Figure 6-21, by touching the 'Charts' key on the GTN Options page. This page allows you to select the which charts are installed on the GTN. Selections are None, FliteCharts, or ChartView.

NOTE

A ChartView Enablement card (P/N 010-00878-40) is needed for ChartView.

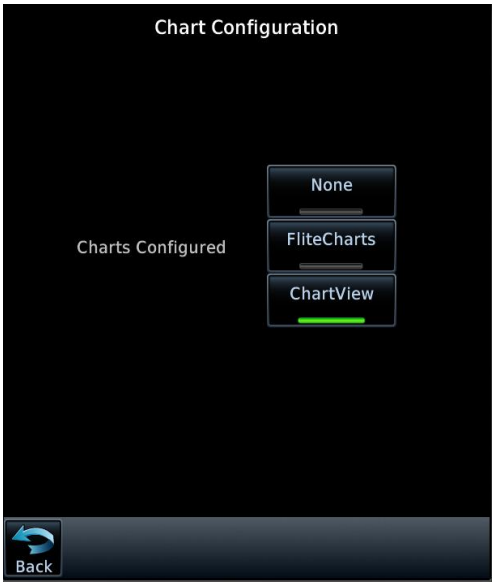


Figure 6-21. Chart Configuration Page

6.7.3 COM Transmit Power Configuration Page

Access the COM Transmit Power Configuration page, as shown in Figure 6-22, by touching the 'COM' key on the GTN Options page. This page allows you to select the transmit power mode. Selections are Normal and 16W.

NOTE

A 16W COM Enablement Card (P/N 010-00878-04) is needed for 16W COM.

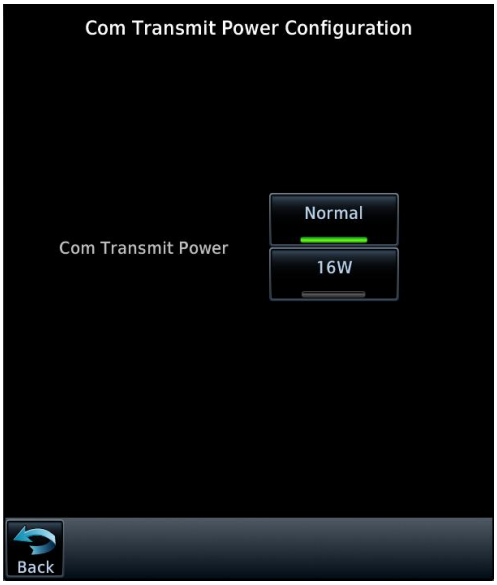


Figure 6-22. COM Transmit Power Configuration Page

6.8 GTN Diagnostics Page

Access the GTN Diagnostics page, as shown in Figure 6-23, by touching the 'GTN Diagnostics' key on the Configuration Mode page. The following sections describe the pages that are available on the GTN Diagnostics page.

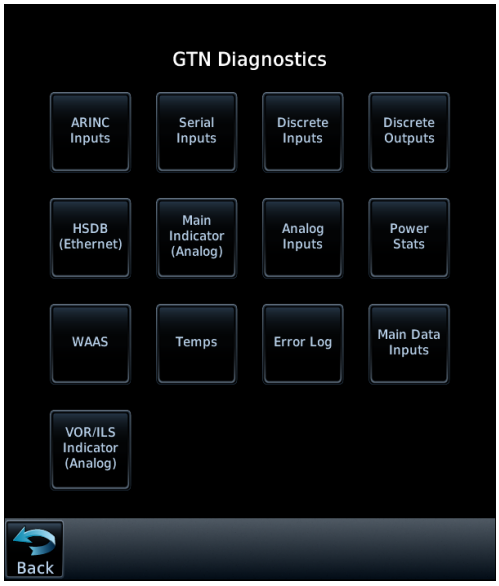


Figure 6-23. GTN Diagnostics Page

6.8.1 ARINC Inputs Page

The ARINC Inputs diagnostics page allows the display of ARINC 429 data that is being received over each ARINC 429 port. Each port can be chosen for display by touching the 'Port' key and toggling between the input ports. Select a port to display. The GTN will then display the label, SSM, Data, and SDI for each ARINC 429 input port. The data log can be paused by toggling the 'Pause' key. Clear the data log by touching the 'Clear Log' key.

6.8.2 Serial Inputs Page

The Serial Inputs page allows the display of serial data that is being received and is useful for determining if the GTN is receiving data on each connected port. Select the desired port by touching the key labeled 'Port' and selecting the RS-232 channel from the list. The data log can be paused by toggling the 'Pause' key. Clear the data log by touching the 'Clear Log' key.

6.8.3 Discrete Pages

6.8.3.1 Discrete Inputs Page

The Discrete Inputs page displays the state of each discrete input of the GTN. To perform a checkout of all discrete inputs see Section 6.10.3.

6.8.3.2 Discrete Outputs Page

The Discrete Outputs page displays the state of each discrete output of the GTN and allows the state to be toggled. To perform a checkout of all discrete outputs see Section 6.10.4.

6.8.4 HSDB (Ethernet) Page

The HSDB (Ethernet) page displays the status of each HSDB port. This page displays whether or not each port is receiving data and displays whether the port is connected or not connected. The configuration status of each installed HSDB LRU is also displayed. See Section 6.6.3 for HSDB port configuration instructions.

6.8.5 Main Indicator (Analog) Diagnostics Page

The Main Indicator diagnostics page allows the CDI connected to the main board (P1001) to be ground checked and allows the interface to be verified. For the Main Indicator checkout procedure, see Section 6.10.1.

6.8.6 Analog Inputs Page

The Analog Inputs page displays the bus voltage setting for Lighting Bus 1 and Lighting Bus 2 as well is the input voltage setting for each bus. It also displays synchro heading input diagnostics information such as heading angle, heading valid status, AC voltage, and AC frequency.

6.8.7 Power Statistics Page

The Power Statistics page displays the number of times the GTN has powered up as well as the total elapsed operating hours for the GTN.

6.8.8 WAAS Diagnostics Page

The WAAS Diagnostics page displays the WAAS engine status, including UTC date/time, current Lat/Lon, overall navigation status, oscillator temperature, and AGC voltage. This page also allows the GPS/WAAS engine to be reset.

6.8.9 Temperatures Page

The Temperatures page displays the current, minimum, maximum, and average board temperatures for the LED board, main board, display interface board, GPS/WAAS board, and COM board.

6.8.10 Error Log Page

The Error Log page allows the error log to be written to the SD card in the front slot. It also allows the error log to be cleared.

6.8.11 Main Data Inputs Page

The Main Data Inputs page allows the data on ARINC 429, RS-232, and other electrical inputs to be monitored. This is used for verifying electrical interfaces during installation and troubleshooting. Information that is not being received by the GTN is dashed out.

6.8.12 VOR/ILS Indicator (Analog) Page

The VOR/ILS Indicator (Analog) Diagnostics page allows the CDI connected to the NAV board (P1004) to be ground checked and allows the NAV indicator interface to be verified. See Section 6.10.2 for the ground check.

6.9 External Systems

The following section contains procedures for configuring remote-mount units that are connected to the GTN. To configure external systems using the GTN, touch the 'External Systems' key from the Configuration Mode page.

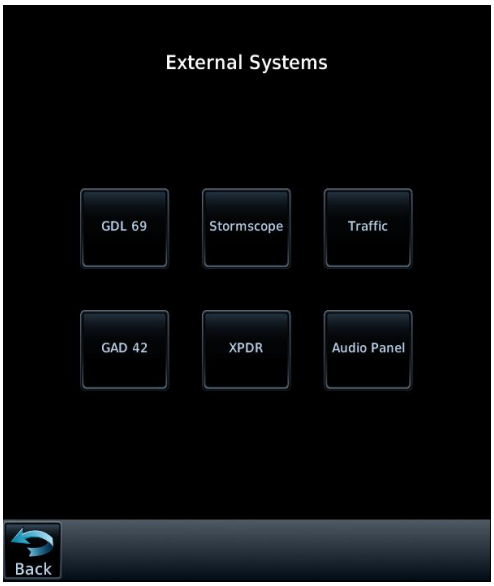


Figure 6-24. External Systems Page

6.9.1 GDL 69/69A Interface Check

If installed, the GDL 69/69A must be configured to match the installation. Follow the steps below.

1. Access the GDL 69/69A Configuration page, as shown in Figure 6-25, by touching the 'GDL 69' key on the External Systems page.
2. Adjust the Antenna Gain and Cable Loss to match the installation. Refer to the GDL 69/69A Installation Manual (190-00355-02) to determine the correct values.
3. Enable any GDL 69/69A Ethernet ports as required by the installation.

NOTE

The GDL 69/69A XM must be activated before use. If the XM has not been active, see the GDL 69/69A Installation Manual (190-00355-02) and the GDL 69/69A XM Activation Instructions (190-00355-04).

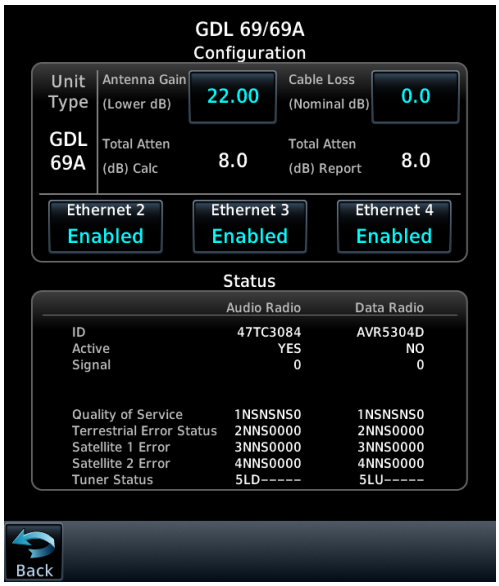


Figure 6-25. GDL 69/69A Configuration Page

6.9.2 Stormscope® Page

NOTE

The Stormscope pages are only available if the WX-500 is connected to the RS-232 channel that is configured for the WX-500.

6.9.2.1 Stormscope® Configuration Page

Access the Stormscope Configuration page, as shown in Figure 6-27, by touching the 'Configure' key on the Stormscope page, as shown in Figure 6-26. The L3 Communications WX-500 Stormscope configuration is reported by the WX-500 through RS-232 data.

To display the Stormscope configuration information, touch the 'Configure' key. Verify the Status field indicates "Ok", and that the other displayed parameters are correct based upon the installation. See the configuration information in the WX-500 Installation Manual to determine the correct configuration.

When a GTN is interfaced with a WX-500 Stormscope, the "Synchro" or "Serial" heading formats may be used. If another heading format is used, lightning strike information is visible on the Weather Page, but not the Map Page.

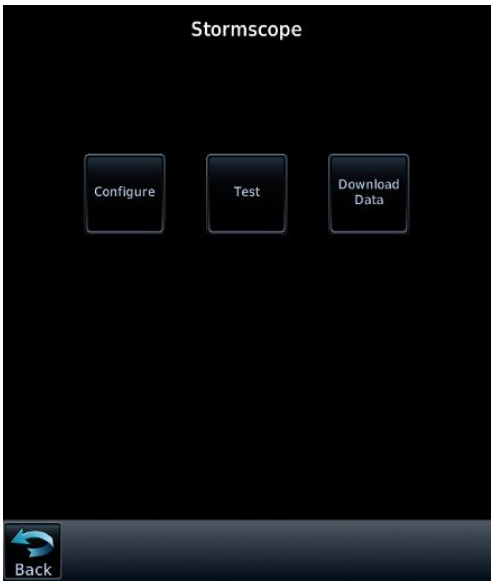


Figure 6-26. Stormscope Page

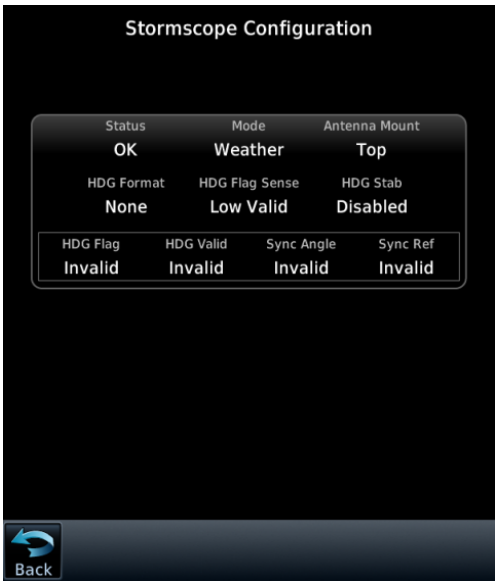


Figure 6-27. Stormscope Configuration Page

6.9.2.2 Stormscope® Test Page

Access the Stormscope Test page, as shown in Figure 6-28, by touching the 'Test' key from the Stormscope page. This page shows current strike activity, WX-500 status, and the heading supplied by the WX-500. The WX-500 mode may be changed to Cell, Strike, Noise, Strike Test, Self Test, and Demo by touching the 'Menu' key and displaying the Stormscope Test Menu as shown in Figure 6-29.

The strikes can be cleared from the display by touching the 'Clear Strikes' key. The view can be changed by touching the 360˚ key or the Arc key.

Verify that the WX-500 mode can be changed. Refer to the WX-500 manual for specific installation test procedures for the WX-500, using this page to view strike data, change the WX-500 mode, view WX-500 status, trigger count, and heading.

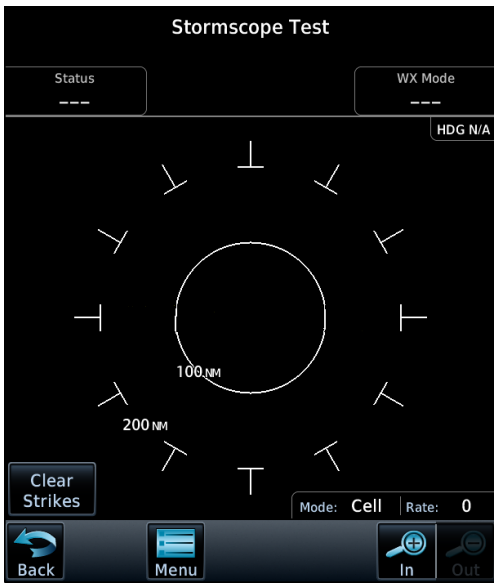


Figure 6-28. Stormscope Test Page

6.9.2.3 Stormscope® Download Data Page

Access the Stormscope Download Data page by touching the 'Download Data' key on the Stormscope page, as shown in Figure 6-26. This page shows raw data downloadable from the WX-500. Optional sets of data include WX-500 software version, configuration data, environment data, and fault log data.

Verify that the configuration data is correct as intended. To request which packet of data to display, touch the key underneath 'Data to Display' and select a data type from the menu.

Figure 6-29. Stormscope Test Menu Page

6.9.3 Traffic Test Page

NOTE

The following pages are only available if one of the ARINC 429 inputs is configured for a traffic format.

Access the Traffic Test page, as shown in Figure 6-30, by touching the 'Traffic' key on the External Systems page. The traffic page displays the traffic system modes of operation and current traffic situation.

For the traffic system, this page displays the following information:

- Altitude Mode – Normal, Above, Below, and Unrestricted.
- Operating Mode – Standby, Operate, or TAS Fail.
- Current Altitude
- Current Heading
- BARO Alt and RAD Alt Status

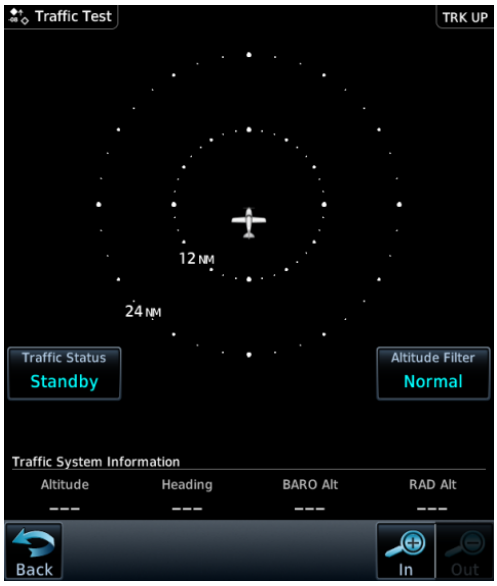


Figure 6-30. Traffic Test Page

6.9.4 GAD 42 Configuration

The GAD 42 can be configured by the GTN if an ARINC 429 input is connected to the GAD 42 and an ARINC 429 output from the GTN is connected to the GAD 42.

Access the GAD 42 Configuration page, as shown in Figure 6-31, by touching the 'GAD 42' key on the External Systems page. The GAD 42 configuration page allows remote configuration of the GAD 42 Interface Adapter Unit. For details on how to configure the unit, see Section 5 of the GAD 42 Installation Manual (P/N 190-00159-00).

Figure 6-31. GAD 42 Configuration Page

6.9.5 Remote Transponder Configuration

A remote transponder can be configured by the GTN via RS-232 if a transponder is configured for one of the RS-232 ports. To configure the transponder, it must first be selected as present and the type of transponder installed must be specified. To do this, see Section 6.6.4. Next, go to the External Systems page and touch the 'XPDR' key. This key displays a page which allows the remote transponder to be configured.

NOTE

If the GTN is not communicating with the transponder, all of the editable fields for the setup items shown in the following sections will be dashed out. If the fields are dashed out, check the wiring and pin connections from the GTN to the transponder.

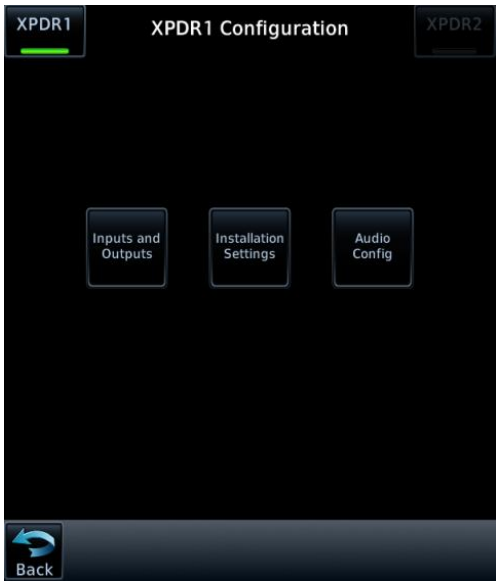


Figure 6-33. XPDR1 Configuration Page

6.9.5.1 Transponder Inputs and Outputs

Access the XPDR Input/Outputs page, as shown in Figure 6-32, by touching the 'Inputs and Outputs' key from the XPDR Configuration page. The transponder RS-232 port inputs can be configured by the GTN. RS-232 Port 1 input for the transponder can only be set to Remote, and is the default for Port 1 input. RS-232 Port 1 is used for control and remote configuring of the transponder.

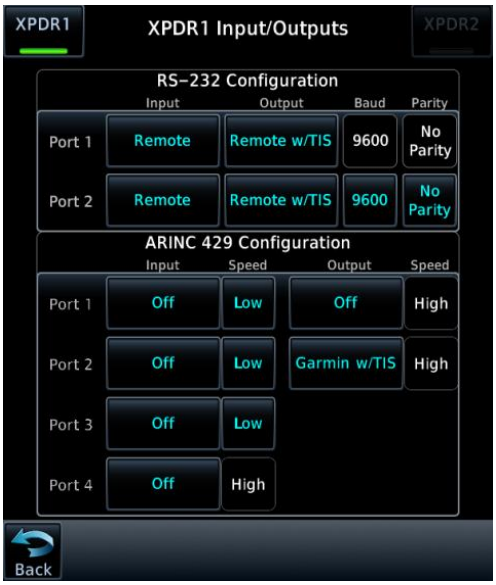


Figure 6-32. XPDR Input/Outputs Page

6.9.5.2 RS-232 Configuration

The following outlines RS-232 port settings and describes what each setting is used for. Select the correct input/output setting based upon the installed interfaced equipment.

RS-232 PORT 1 INPUT

Selection	Description
Remote	The RS-232 port is configured for remote control by the GTN.

RS-232 PORT 1 OUTPUTS

Selection	Description
Remote	RS-232 serial output remote data.
Remote + TIS	RS-232 serial output remote data with TIS.

RS-232 PORT 2 INPUTS

GTN Selection	GTX 330 Equivalent	Description
OFF	**Off**	DEFAULT. The altitude code input is not from an RS-232 source.
Airdata Format 1	**ADC**	RS-232 serial air data information from air data computer plus altitude data.
Airdata Format 2	**ADC no Alt**	RS-232 serial air data information from air data computer.
Altitude Format 1	**Icarus Alt**	RS-232 reports serial altitude information.
Altitude Format 2	**Icarus Alt 25 ft**	RS-232 reports altitude information in 25-foot increments.
Altitude Format 3	**Shadin Alt**	RS-232 serial altitude from encoders.
Altitude Format 4	**Shadin Alt 25 ft**	Reports altitude information in 25-foot increments.
FADC Format 1	**FADC w/Alt**	RS-232 serial air data from air data computers, fuel/air data computers plus altitude data.
FADC Format 2	**FADC No Alt**	RS-232 serial air data from air data computers and fuel/air data computers.
GPS	**GPS**	RS-232 ground speed from a GPS device.
Remote	**Remote**	RS-232 serial input remote data.

RS-232 PORT 2 OUTPUTS

GTN Selection	GTX 330 Equivalent	Description
OFF	**Off**	Default for channel 2. No unit is connected to the output of this channel.
Altitude Format 1	**Icarus Alt**	RS-232 serial altitude from an Icarus Instruments 3000.
REMOTE	**N/A**	RS-232 serial output remote data.
REMOTE w/TIS	**N/A**	RS-232 serial output remote data with TIS.

BAUD RATE SELECTIONS

Select the baud rate for each RS-232 channel.

Selection	Description
9600	Sets the baud rate to 9600 Bd.
19200	Sets the baud rate to 19200 Bd.
28800	Sets the baud rate to 28800 Bd.
38400	Sets the baud rate to 38400 Bd.
57600	Sets the baud rate to 57600 Bd.

PARITY SELECTIONS

Select the parity for RS-232 channel 2.

Selection	Description
Even Parity	Sets the Parity to Even.
No Parity	Sets the Parity to None.
Odd Parity	Sets the Parity to Odd.

6.9.5.3 ARINC 429 Configuration

Configure the four ARINC 429 input ports and the two ARINC 429 output ports. Select the correct speed for each port depending upon the installed interfaced equipment by touching the speed key and toggling the high or low selection. Each port can be configured independently for the desired functions by selecting the desired data format from the menu.

SPEED SELECTIONS

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 Kb per second)
High	High-speed ARINC 429 (nominally 100 Kb per second)

Select the correct Data In and Data Out settings for each port. The data selections are described below.

ARINC 429 INPUT SELECTIONS

Channel	Selection	Description
All	**OFF**	No unit connected to this ARINC 429 input
1 through 3	**ADC NO ALT**	Temperature and speed information
	ADC w/ALT	Altitude, temperature and speed information
	AFCS	Selected altitude, baro setting, and pitch discretes.
	AHRS	Attitude and heading information
	EFIS/ADC NO ALT	Selected course, heading, temperature, joystick waypoint and speed information
	EFIS/ADC w/ALT	Selected course, heading, temperature, joystick waypoint and speed information plus altitude data
	GARMIN 743A	Standard GNSS output. Includes position, velocity, and integrity data.
	GARMIN DISPLAY	Same as GPS with added ability of receiving phase of flight data.
	GARMIN TAS	Traffic Advisory System discretes.
	GPS	Selected waypoint information and GPS ground speed recognition.
4	**ADLP**	Airborne Data Link Processor. ADLP is available only on channel 4.

The GTX 33 receives one of the following sets of ARINC 429 data. The labels are chosen when selected in ARINC 429 INPUT. The received data may be at either LOW or HIGH speed. The default is LOW. The received data labels are as follows:

AHRS COMPUTER (AHRS)

Label #	Data
314	True Heading (degrees)
320	Magnetic Heading (degrees)
325	Roll Angle
365	Vertical Rate (feet/min)

AIR DATA COMPUTER (ADC)

Label #	Data
203*	Pressure Altitude (feet)
204	Barometric Corrected Altitude (feet)
205	Mach Number
206	Indicated Air Speed (knots)
210	True Air Speed (knots)
211	Total Air Temperature (degrees)
212	Vertical Speed (feet/min)
213	Static Air Temperature (degrees)

* If ADC W/ALT or EFIS/ADC W/ ALT format selected.

EFIS DISPLAY SYSTEM (EFIS/ADC)

Label #	Data
100	Selected Course (degrees)
102	Selected Altitude (feet)
203*	Pressure Altitude (feet)
204	Barometric Corrected Altitude (feet)
205	Mach Number
206	Indicated Air Speed (knots)
210	True Air Speed (knots)
211	Total Air Temperature (degrees)
212	Vertical Speed (feet/min)
213	Static Air Temperature (degrees)
234	Barometric Setting (hPa)
235	Barometric Setting (“Hg)
314	True Heading
320	Magnetic Heading (degrees)
325	Roll Angle

* If ADC W/ALT or EFIS/ADC W/ALT format selected.

GPS/FMS NAVIGATION SYSTEM (GPS)

Label #	Data
102	Selected Altitude (feet)
310	GPS Latitude (degrees)
311	GPS Longitude (degrees)
312	Ground Speed (knots)
313	Track Angle (degrees)

GARMIN DISPLAY

Label #	Data
310	GPS Latitude (degrees)
311	GPS Longitude (degrees)
261	GPS Discretes
312	GPS Ground Speed (knots)
313	GPS Track Angle (degrees)
314	True Heading (degrees)
320	Magnetic Heading (degrees)

GARMIN TAS

Label #	Data
274	TAS Discretes

AFCS

Label #	Data
102	Selected Altitude (feet)
234	Barometric Setting (hPa)
235	Barometric Setting (“Hg)
271	Pitch Discretes

ARINC 429 OUTPUT SELECTIONS

ARINC 429 Channel 1 defaults to Off. Each output port can be configured independently for the desired function. Both ARINC 429 outputs send high speed ARINC 429 data.

Selection	Description
CHANNEL 1 (DATA)	DATA SOURCE: OFF, ADLP, GARMIN, GARMIN TAS, or GARMIN W/TIS. DEFAULTS to OFF. ARINC 429 input channel 4 sets the ARINC 429 output channel 1 to the same selection.
CHANNEL 2 (DATA)	DATA SOURCE: OFF, GARMIN, GARMIN TAS, or GARMIN W/TIS. DEFAULTS to GARMIN W/TIS. Do not select GARMIN W/TIS if the aircraft contains another traffic detection system.

The Garmin format is a data concentration function. The following data is sent out at specified intervals using high speed ARINC 429 (100 kHz). The transmit data labels and their rates are as follows:

Label #	Data	Rate
100	Selected Course (degrees)	200 ms
203	Pressure Altitude (feet)	100 ms
204	Barometric Corrected Altitude (feet)	100 ms
206	Indicated Air Speed (knots)	100 ms
210	True Air Speed (knots)	100 ms
211	Total Air Temperature (degrees)	100 ms
213	Static Air Temperature (degrees)	100 ms
314	True Heading	100 ms
320	Magnetic Heading (degrees)	100 ms
371	GA Equipment Identifier	500 ms
377	Equipment Identifier	500 ms

The following data is sent out in packets approximately every 0.5 seconds at high speed (100 kHz), in the specified sequence:

Label #	Data
350	Fault Summary
274	Transponder Control
313	Own Aircraft Track Angle
357 (RTS)	Request to Send
130	Intruder Range (0 – 8 sets)
131	Intruder Altitude (0 – 8 sets)
132	Intruder Bearing (0 – 8 sets)
357 (EXT)	End of Transmission

6.9.5.4 Transponder Installation Settings Page

Access the XPDR Installation Settings page, as shown in Figure 6-34, by touching the 'Installation Settings' key from the XPDR Configuration page.

VFR BUTTON CODE

Input a VFR transponder code by touching the key and typing the selected code into the keypad. This field has a range of 0000-7777.

NOTE

Avoid selecting code 7500 and all codes in the 7600-7777 range. These codes trigger special indicators in automated facilities. An aircraft's transponder code is used for ATC tracking purposes, therefore exercise care when making routine code changes.

AIRCRAFT WEIGHT

Select the weight of the aircraft in which the transponder is installed.

Figure 6-34. XPDR Installation Settings Page

Selection	Description
<15,500 LBS	Configures the aircraft weight to less than 15,000 lbs.
>=15,500 LBS	Configures the aircraft weight to equal to or greater than 15,000 lbs.
ROTORCRAFT	Configures to rotorcraft use.
UNKNOWN	Aircraft weight is unknown.

AUTO STANDBY DELAY

This is the number of seconds the aircraft must be on the ground before the transponder automatically switches to GND mode when it has a means of determining the aircraft is on the ground. It has a range of 0 (zero) seconds to 99 seconds.

ALTITUDE CLIMB RATE FOR AIRBORNE TRANSITION

This is the climb rate that is required in order to transition from ground to airborne state. This field is adjustable from 100 fpm to 9999 fpm.

AIR/GROUND LOGIC

Select the source for the air/ground logic.

Selection	Description
Auto Airborne Off	The transponder will not automatically transition to operate mode when it senses the aircraft is airborne.
Squat Switch	The transponder is connected to a squat switch to determine airborne state.
GPS Data	The transponder is using GPS data to determine the airborne state.
Altitude Data	The transponder is using an altitude source to determine the airborne state.

SQUAT SWITCH SENSE

The squat switch sense field may be set to either High or Low. If the air/ground logic field is set to squat switch, the squat switch sense field is used to define the state of the squat switch input. If the squat sense field is set to High, then when the squat switch input is high, the aircraft is considered to be on the ground. If the squat sense field is set to low, then when the squat switch input is low, the aircraft is considered to be on the ground.

MAX AIRSPEED (GTX 33 ONLY)

Select the maximum true airspeed for the aircraft. The default is <= 150 KTS.

Selection	Description
<= 75 KTS	Max aircraft operating speeds less than or equal to 75 knots TAS.
<= 150 KTS	Max aircraft operating speeds less than or equal to 150 knots TAS.
<=300 KTS	Max aircraft operating speeds less than or equal to 300 knots TAS.
<=600 KTS	Max aircraft operating speeds less than or equal to 600 knots TAS.
<=1200 KTS	Max aircraft operating speeds less than or equal to 1200 knots TAS.
>1200 KTS	Max aircraft operating speeds greater than 1200 knots TAS.
UNKNOWN	Max aircraft speed is unknown.

ADDRESS TYPE (GTX 33 ONLY)

Select the method of entry of the aircraft address.

Selection	Description
US Tail	For future use. Invalid Selection. Do not select US Tail. Address can only be entered in hexadecimal code format.
HEX ID	Allows technician to enter the aircraft registration number in hexadecimal code format. This is the only valid selection.

ADDRESS (GTX 33 ONLY)

Enter the Aircraft Address. Enter the aircraft registration number in hexadecimal code format. The Octal code for the Mode S Address is an 8-digit number that can be found on the aircraft registration certificate or by visiting www.faa.gov and entering the N-number of the aircraft into the N-number inquiry section of the website. Convert the Octal Mode S Address into hexadecimal format and enter the hex ID of the aircraft. If the 'Flight ID' is configured to SAME AS TAIL, ensure that the correct tail number appears in the Flight ID field.

NOTE

The Octal Mode S Address can be converted to hexadecimal format with the use of a scientific calculator. Microsoft Windows calculator can be used by selecting 'scientific' view and then by entering the octal code. With 'Oct' selected on the calculator, enter the Octal Mode S Address. Change the selection to 'Hex', as shown in Figure 6-35, and enter the displayed Hex code into the address field on the GTN.

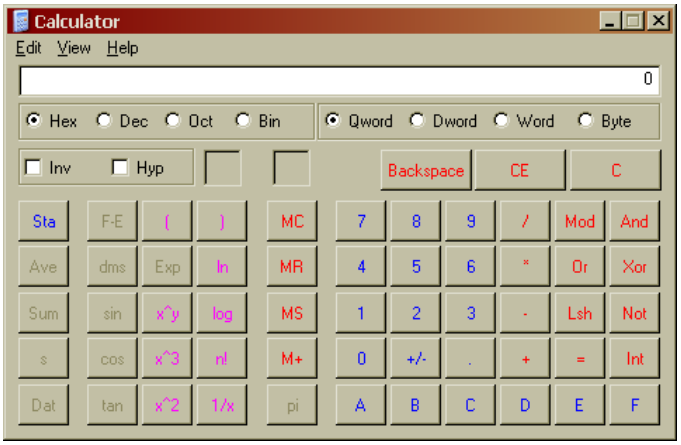

Calculator
Edit View Help
0
Hex Dec Oct Bin
Qword Dword Word Byte
Inv Hyp
Backspace CE C
Sta F-E ( ) MC 7 8 9 / Mod And
Ave dms Exp ln MR 4 5 6 * Or Xor
Sum sin x^y log MS 1 2 3 - Lsh Not
s cos x^3 n! M+ 0 +/- . + = Int
Dat tan x^2 1/x pi A B C D E F

Figure 6-35. Microsoft Windows Calculator

FLIGHT ID TYPE (GTX 33 ONLY)

For operation requiring the flight crew to enter an aircraft identification designator, select the page identified as PILOT ENTRY. When this choice is selected and the crew enters the Flight ID correctly, the flight number call sign for radio contact with ATC is the same flight identification that the GTX 33 Mode S transponder replies to ATC radar interrogations.

Selection	Description
CONFIG ENTRY	Allows technician to enter Flight ID while in configuration mode only.
PILOT ENTRY	Allows pilot/technician to enter Flight ID in the GTN in normal mode.
SAME AS TAIL	If Address Type is US Tail, allows Flight ID to use the same number.

Selecting PILOT ENTRY allows the Flight ID to remain the same as that entered during the previous flight until it is updated, the crew is not prompted to update the Flight ID. The selections 'SAME AS TAIL' and 'CONFIG ENTRY' are fixed Mode S addresses.

AIRCRAFT LENGTH (GTX 33 ONLY)

Sets the length of the aircraft to less than or equal to 15 meters (49 ft), less than or equal to 25 meters (82 ft), less than or equal to 35 meters (115 ft), less than or equal to 45 meters (148 ft), less than or equal to 55 meters (180 ft), less than or equal to 65 meters (213 ft), less than or equal to 75 meters (246 ft), less than or equal to 85 meters (279 ft), or more than 85 meters (279 ft). Enter the aircraft's minimum length category.

AIRCRAFT WIDTH (GTX 33 ONLY)

Sets the wingspan of the aircraft to less than or equal to 11.5 meters (38 ft), less than or equal to 23.0 meters (75 ft), less than or equal to 28.5 meters (94 ft), less than or equal to 33.0 meters (108 ft), less than or equal to 34.0 meters (112 ft), less than or equal to 38.0 meters (125 ft), less than or equal to 39.5 meters (130 ft), less than or equal to 45.0 meters (148 ft), less than or equal to 52.0 meters (171 ft), less than or equal to 59.5 meters (195 ft), less than or equal to 67.0 meters (220 ft), less than or equal to 72.5 meters (238 ft), less than or equal to 80.0 meters (262 ft), or more then 80.0 meters (262 ft). Enter the aircraft's minimum width category.

ENHANCED SURVEILLANCE (GTX 33 ONLY)

Sets Enhanced Surveillance (EHS) to DISABLE or ENABLE. When EHS is set to DISABLE the enhanced surveillance function is not available.

SURVEILLANCE INTEGRITY LEVEL (GTX 33 ONLY)

NOTE

When interfaced to the GTN, the GPS Integrity must be set to 1E-5.This field sets the correct GPS Integrity for the interfaced GPS receiver. Set to 1E-3, 1E-5, or 1E-7.

NOTE

The GPS INTEGRITY configuration field indicates the integrity of the GPS sensor that is connected to the transponder. It is measured in errors per flight hour, 1E-3 being the worst and 1E-7 being the best rating. This data is used in ADS-B transmissions.

TEMPERATURE SWITCH INSTALLED (GTX 33 ONLY)

This field determines if a temperature switch is connected to the GTX 33. Select 'Yes' if a temperature switch is connected to the transponder; select 'No' if not.

6.9.5.5 Transponder Audio Configuration

Access the XPDR Audio Configuration page, as shown in Figure 6-36, by touching the 'XPDR' key on the External Systems page followed by touching the 'Audio Config' key, as shown in Figure 6-33.

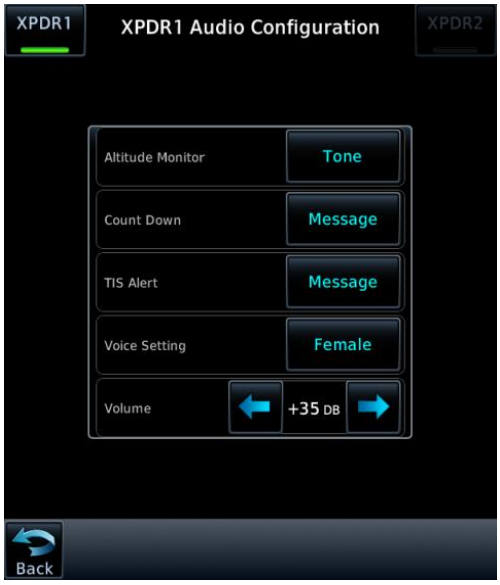


Figure 6-36. XPDR Audio Configuration Page

ALTITUDE MONITOR

Select the desired audio type for the Altitude Monitor alert. The choices are Off, Tone, or Message.

COUNT DOWN TIMER

Select the desired audio type for the Count Down Timer alert. The choices are Off, Tone, or Message.

TIS ALERT

Select the desired audio type for TIS alerts. The choices are Off, Tone, or Message.

VOICE SETTING

Set the voice type to male or female.

VOLUME

Adjust the desired volume level for transponder audio. Volume is adjusted from 0 to +63 dB. Ensure the volume level is sufficient for all anticipated cockpit noise environments.

6.9.6 GMA 35 Audio Panel Configuration

6.9.6.1 Audio Terminology

The following terms will be used throughout the audio panel configuration sections and are defined here.

Term	Definition
ALERT	Unswitched inputs. These inputs are typically warnings, and there is no way for the user to de-select the audio.
COPILOT	The second crewmember is considered the COPILOT. The copilot is typically the front right-seat for airplanes.
CREW	Refers to aircraft occupants who can transmit on radios. i.e. PILOT and COPILOT. In certain installations, each crew member may be able to individually select radios.
ICS	Intercom Communication System - This refers to the distribution of microphone audio for each occupant in the aircraft.
PA	Passenger Address - This refers to a crewmember broadcasting audio to the Passengers either through headsets or speakers outside of the ICS distribution.
PASSENGERS	Occupants considered passengers are not able to transmit or select individual radios, and are treated as a group in that each PASSENGER hears the same audio.
PILOT	The first crewmember is considered the PILOT. The pilot is typically the front left-seat for airplanes. This crew position will always hear Selected Audio (SA).
PTT	Push-To-Talk - This refers to keyed microphone transmissions. An input must be activated before the microphone audio is transmitted.
PRIMARY RADIO	For a crewmember, the Primary Radio is the radio selected for transmission. A Push-to-talk (PTT) by a crewmember will transmit over the PRIMARY RADIO.
SA	Selected Audio - This refers to the combination of audio sources selected by the crewmember. Note that Alerts are separate from Selected Audio.
SECONDARY RADIOS	For a crewmember, any radio selected for monitoring that is not selected for transmission is considered a Secondary Radio.
SOFT MUTE	When music audio is muted due to an audio interruption such as ICS or alerts, Soft Mute feature allows music audio to fade in gradually to the original volume setting after muting.
SIDETONE	Sidetone refers to the audio spoken into the microphone by an occupant. Many half-duplex radios provide sidetone audio to the radio's received audio output. When transmitting on these radios, it is not desired for the Audio Panel to provide the sidetone to the headset since this is usually provided by the transceiver. For PA and Telephone audio, sidetone distribution may be adjusted.

6.9.7 GMA 35 Audio Panel Settings

To configure the audio panel, go to the External Systems page and touch the Audio Panel key to display the Audio Panel page as shown in Figure 6-37. On the Audio Panel page, touch the 'Configure' key to access configuration settings for audio routing, volume, and miscellaneous options. The 'Connected Radios' menu allows the radios that are connected to the audio panel to be configured.

Under the 'Configure' page, there is a key labeled 'Set to Default Config', which will command the audio panel settings back to the factory default configuration. Throughout the next sections, the default settings are noted. If it is desired to set all audio panel settings back to the default, touch this key. A prompt will appear with 'Set Audio Panel to Default Configuration?'. Select 'OK' to acknowledge the prompt, as shown in Figure 6-38.

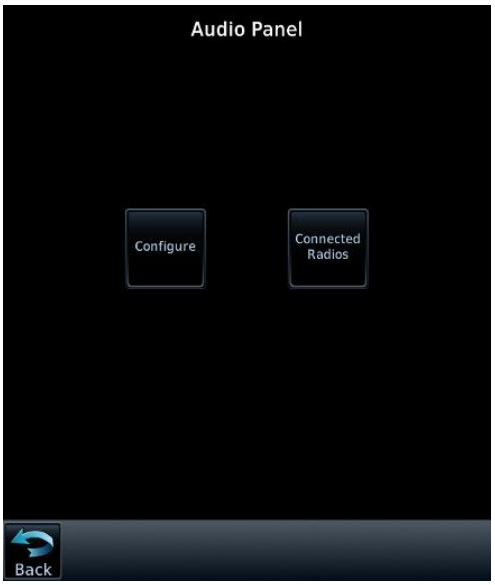


Figure 6-37. Audio Panel Page

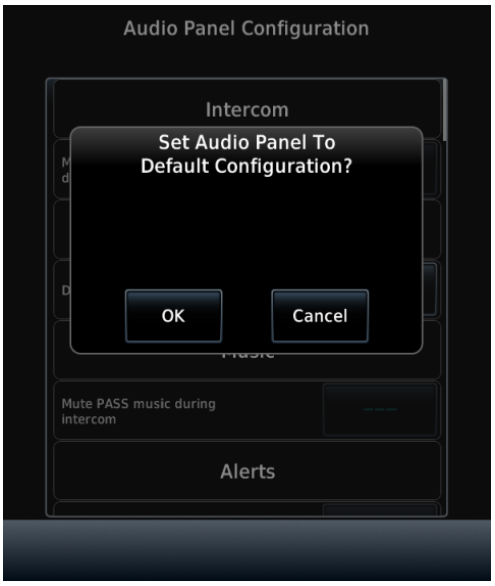


Figure 6-38. Audio Panel Default Configuration Page

6.9.8 Audio Panel Configuration Settings

Mute PASS to CREW intercom during alerts

This option mutes the passenger ICS audio to the crew during system alerts. Select 'True' to mute passenger audio during alerts or select 'False' to allow passenger audio to be audible to the crew during alerts. True is the default selection.

Disable PA functionality

Select 'True' to disable the passenger address function. Select 'False' to enable the PA functionality. False is the default selection.

Mute PASS music during intercom

Select 'True' to mute passenger music while the passengers are hearing microphone audio from an occupant. Select 'False' to have passenger music to continue playing during ICS audio. True is the default selection.

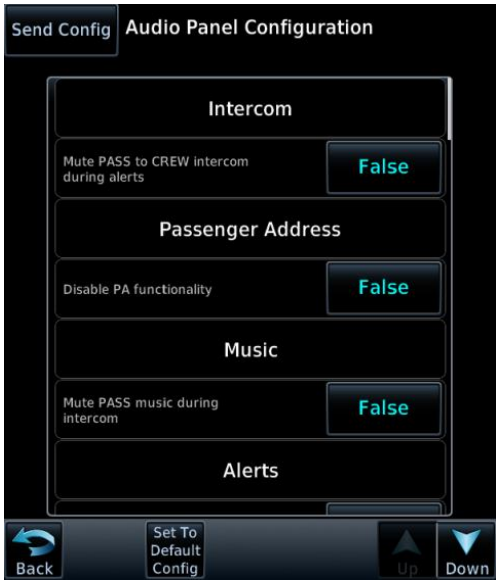


Figure 6-39. Audio Panel Configuration Page

Passengers hear alerts

Select 'True' to have passengers to hear alert audio. Select 'False' to disable alert audio routing to the passengers. False is the default selection.

Mute secondary radios on primary radio reception (Monitor Mute)

Select 'True' to have all secondary COM audio muted upon receiving primary COM audio. Select 'False' to have secondary COM audio play simultaneously with primary COM audio reception. False is the default selection.

Audio Processor generates COM1 internal sidetone

Select 'True' to have the audio panel provide COM1 sidetone in installations in which the COM1 radio does not provide sidetone audio. Select 'False' to have the COM1 radio generate its own sidetone. False is the default selection.

Audio Processor generates COM2 internal sidetone

Select 'True' to have the audio panel provide COM2 sidetone in installations in which the COM2 radio does not provide sidetone audio. Select 'False' to have the COM2 radio generate its own sidetone. False is the default selection.

Audio Processor generates COM3 internal sidetone

Select 'True' to have the audio panel provide COM3 sidetone in installations in which the COM3 radio does not provide sidetone audio. Select 'False' to allow the COM3 radio generate its own sidetone. False is the default selection.

COM 1 is connected as COM 2

Select 'True' if COM1 is connected as COM2 and select 'False' if COM1 is connected as COM1. False is the default selection. This setting allows the GTN to be connected to the COM2 port, but appear to the pilot as COM1.

Ambient Noise Mic On

Select 'True' to enable the ambient noise sensor that is built into the GMA 35. Select 'False' to disable the noise sensor. The ambient noise sensor allows the GMA 35 to adjust the volume of the speaker and headsets based upon the ambient noise environment. The ambient noise sensor is mounted internal to the GMA 35, with no external wiring. False is the default selection.

6.9.9 Volume Configuration Settings

Use the following procedure when adjusting volumes in the GMA 35 to provide the best audio results. This procedure allows the signal levels in the audio wires to be large so that they are more resistant to noise interference. When audio levels can be controlled at the audio source and the GMA 35 has an input gain control for the audio source, perform the following procedure:

1. Adjust the source audio level to the minimum and the audio panel input gain control to the minimum.
2. Adjust the volume settings on the audio panel for normal operation.
3. Increase the audio source level until the desired audio level is reached or the audio source is close to the maximum specified input level for the audio panel input.

If the audio from the audio source is not loud enough, increase the audio panel input gain until the desired audio level is reached. Repeat this setup for each audio source and audio panel input with adjustable gains.

If the audio source does not have adjustable gain then adjust the gain for the audio panel input until the desired audio level is reached. For volume adjustments on the GMA 35, increasing the gain to +96 will increase the volume, and decreasing the gain to -96 will decrease the volume.

If the audio panel input does not have adjustable gain then adjust the audio source gain until the desired audio level is reached. Refer to the audio source manufacturer's installation documentation for volume adjustment instructions.

NOTE

For the volume settings described below, higher gain values increase volume, and lower gain values decrease volume.

Alert 1 thru 4 input audio volume

These settings allow the unswitched alert input audio to the GMA 35 to be adjusted. This setting is configurable from -96 to +96. The default is 0.

Failsafe warn input audio volume

This setting allows the failsafe warn audio input to the GMA 35 to be adjusted. This setting is configurable from -96 to +96. The default is 0.

Marker volume

This adjusts the marker beacon volume output to the crew headsets. This setting is configurable from -96 to +96. The default is 0. This setting adjusts the maximum allowable volume range in GTN normal mode.

Music 1 and Music 2 Volume

This adjusts the volume of the 2 music inputs to the GMA 35. This setting is configurable from -96 to +96. The default is 0. This setting adjusts the maximum allowable volume range in GTN normal mode.

Figure 6-40. Audio Panel Configuration Page

Telephone Volume

This adjusts the Telephone input volume. This setting is configurable from -96 to +96. The default is 0.

6.9.9.1 Speaker Volume Configuration

Pilot PA

This setting adjusts the pilot passenger address to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Copilot PA

This setting adjusts the copilot passenger address to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Crew Audio

This setting adjusts the crew audio to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Alert Audio Sum

This setting adjusts the alert audio to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

6.9.9.2 Squelch Threshold Configuration Settings

COM 1-3 Squelch Threshold

These settings adjust the signal strength required to break squelch for each input. These are configurable from -96 dB to 0 dB. The default value is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

NAV 1 and NAV 2 Squelch Threshold

These settings adjust the signal strength required to break squelch on the NAV 1 and NAV 2 inputs. These are configurable from -96 dB to 0 dB. The default value is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

ADF1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the ADF1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

DME1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the DME1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

AUX1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the AUX1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

WARN1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the WARN1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

RING1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the RING1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

ALERT 1-3 Squelch Threshold

These settings adjust the signal strength required to break squelch on the ALERT1-3 inputs. These are configurable from -96 dB to 0 dB. The default value is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

6.9.9.3 Other GMA 35 Configuration Settings

Marker Beacon high sense threshold

The marker high sensitivity threshold configures the marker beacon signal strength that is required to activate the marker beacon signal in marker high sense mode. This is adjustable from -31 to +31. A value of -31 will cause the marker beacon signal to activate at lower signal strength; therefore the beacon signal will remain active for a longer period of time while on approach. A value of +31 will require the marker beacon signal strength to be much stronger to activate, which results in the marker beacon activating for a very short duration while flying directly over the marker beacon. The default value is 0.

Marker Beacon low sense threshold

The marker low sensitivity threshold configures the marker beacon signal strength that is required to activate the marker beacon signal in marker low sense mode. This is adjustable from -31 to +31. A value of -31 will cause the marker beacon signal to activate at a lower signal strength, therefore the beacon signal will remain active for a longer period of time while on approach. A value of +31 will require the marker beacon signal strength to be much higher to activate, which results in the marker beacon activating for a very short duration while flying directly over the marker beacon. The default value is 0.

Marker external lamp lighting offset

When external marker lamps are connected to the GMA 35, this setting allows the lighting level to be adjusted up or down. It applies an offset to the lighting input that the marker lamps are tracking. If the lamps are too bright, adjust this number down; if the lamps are too dim, adjust this number up. This setting is configurable from -31 to +31. The default is 0.

6.9.9.4 Connected Radios to GMA 35 Configuration

Access Audio Panel Connected Radios page, as shown in Figure 6-41, by touching the 'Connected Radios' key on the Audio Panel page. Touch the 'Connected Radios' key to configure which radios/systems are connected to the GMA 35. Compare the interfaced radios in the aircraft to the GMA 35 Pin function list in Section 5 to determine which radios are connected to the applicable pins in the GMA 35. The following radios can be configured as 'Present' or 'Not Present':

- COM 2
- COM 3
- NAV 1
- NAV 2
- RCVR 3
- RCVR 4
- RCVR 5
- TEL
- Music 1
- Music 2
- Marker Beacon

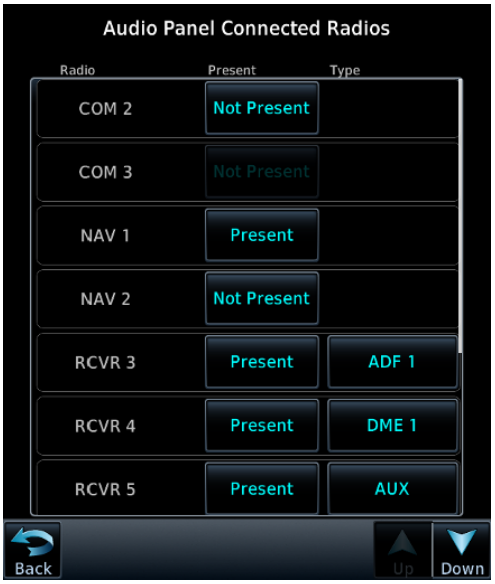


Figure 6-41. Audio Panel Connected Radios Page

For RCVR 3, RCVR 4, and RCVR 5, the type of radio must also be configured. For each connected RCVR source, select the type of radio.

Selection	Description
ADF 1	An Automatic Direction Finder (ADF) is connected to the RCVR input.
ADF 2	A second Automatic Direction Finder (ADF) is connected to the RCVR input.
DME 1	Distance Measuring Equipment (DME) is connected to the RCVR input.
DME 2	A second Distance Measuring Equipment (DME) is connected to the RCVR input.
AUX	An Auxiliary radio is connected to the RCVR input.

6.10 Ground Checks (Configuration Mode)

The following checks are done in Configuration Mode. For instructions concerning entering Configuration Mode, see Section 6.4.

6.10.1 Main Indicator (Analog) Diagnostics

NOTE

If the GTN is interfaced to an electronic HSI and the main indicator analog output is not used, this check is not required.

If the GTN is interfaced to an analog indicator on the main CDI/OBS, perform the following steps:

1. Access the Main Indicator (Analog) Diagnostics page, as shown in Figure 6-42, by touching the 'Main Indicator (Analog)' key on the GTN Diagnostics page.
2. Verify correct operation of the lateral deviation, flag and TO/FROM flag using the corresponding selections.
3. Verify correct operation of the vertical deviation and flag using the corresponding selections.
4. Verify correct operation of the OBS knob using the SELECTED COURSE display. At 30° increments around the OBS card, ensure that the indicated value is within 2° of the value set on the indicator. If the resolver is not within 2°, calibrate the resolver as described in Section 6.6.5.

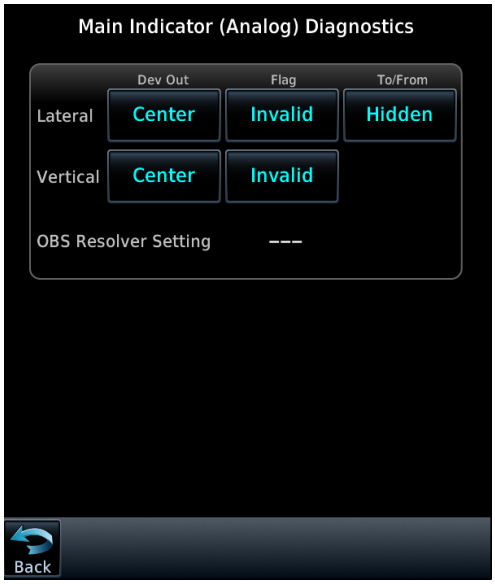


Figure 6-42. Main Indicator (Analog) Diagnostics Page

6.10.2 VOR/ILS Indicator (Analog) Diagnostics Page

If the GTN is interfaced to an analog indicator on the VOR/ILS Indicator output, perform the following steps:

1. Access the VOR/ILS Indicator (Analog) page, as shown in Figure 6-43, by touching the 'VOR/ILS Indicator (Analog)' key on the GTN Diagnostics page.
2. Verify correct operation of the lateral deviation, flag and TO/FROM flag using the corresponding selections.
3. Verify correct operation of the vertical deviation and flag using the corresponding selections.
4. Verify correct operation of the OBS knob using the SELECTED COURSE display. At 30° increments around the OBS card, ensure that the indicated value is within 2° of the value set on the indicator. If the resolver is not within 2°, calibrate the resolver as described in Section 6.6.11.

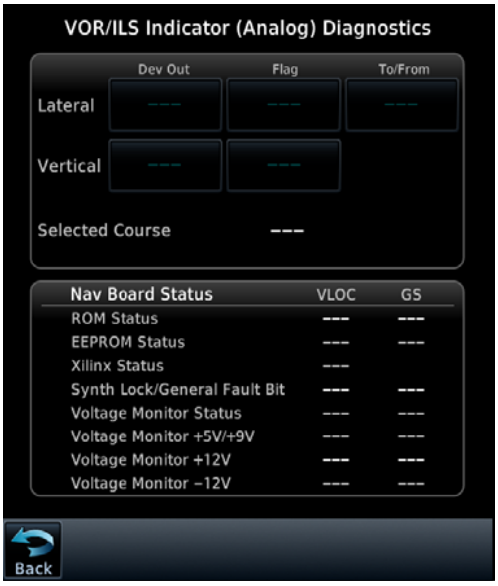


Figure 6-43. VOR/ILS Indicator (Analog) Diagnostics Page

6.10.3 Discrete Inputs Page

If the GTN is connected to external switches, perform the following steps:

1. Access the Discrete Inputs page, as shown in Figure 6-44, by touching the 'Discrete Inputs' key on the GTN Diagnostics page.
2. For each external switch that is connected, exercise the switch and check the 'active' or 'inactive' indication on the screen correlating to the appropriate switch input, and ensure it is displayed correctly.

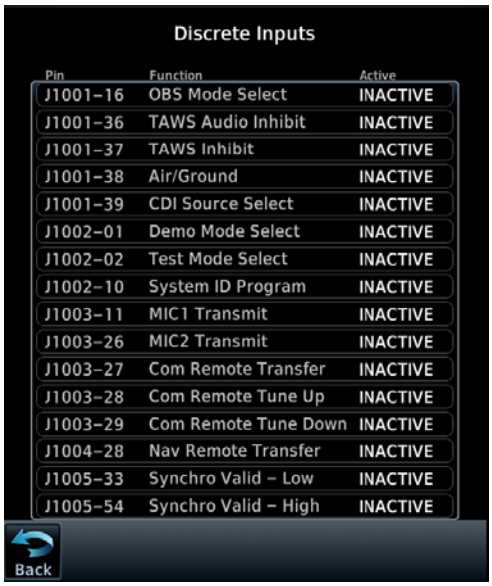

Discrete Inputs
Pin
Function
Active
J1001-16 OBS Mode Select INACTIVE
J1001-36 TAWS Audio Inhibit INACTIVE
J1001-37 TAWS Inhibit INACTIVE
J1001-38 Air/Ground INACTIVE
J1001-39 CDI Source Select INACTIVE
J1002-01 Demo Mode Select INACTIVE
J1002-02 Test Mode Select INACTIVE
J1002-10 System ID Program INACTIVE
J1003-11 MIC1 Transmit INACTIVE
J1003-26 MIC2 Transmit INACTIVE
J1003-27 Com Remote Transfer INACTIVE
J1003-28 Com Remote Tune Up INACTIVE
J1003-29 Com Remote Tune Down INACTIVE
J1004-28 Nav Remote Transfer INACTIVE
J1005-33 Synchro Valid - Low INACTIVE
J1005-54 Synchro Valid - High INACTIVE
Back

Figure 6-44. Discrete Inputs Page

6.10.4 Discrete Outputs Page

If the GTN is connected to external annunciators/systems, perform the following steps:

1. Access the Discrete Outputs page, as shown in Figure 6-45, by touching the 'Discrete Outputs' key on the GTN Diagnostics page.
2. For each annunciator output that is connected to an external system or annunciator, toggle the output ACTIVE (corresponding box is filled green and displays 'ACTIVE') and INACTIVE (corresponding box is not filled green and displays 'INACTIVE') by touching the key corresponding to the output. Verify that the appropriate external annunciator illuminates when the output is set to ACTIVE and extinguishes when the output is set to INACTIVE. If the output is not connected to an annunciator but provides an input to another system, verify that the other system receives the signal.

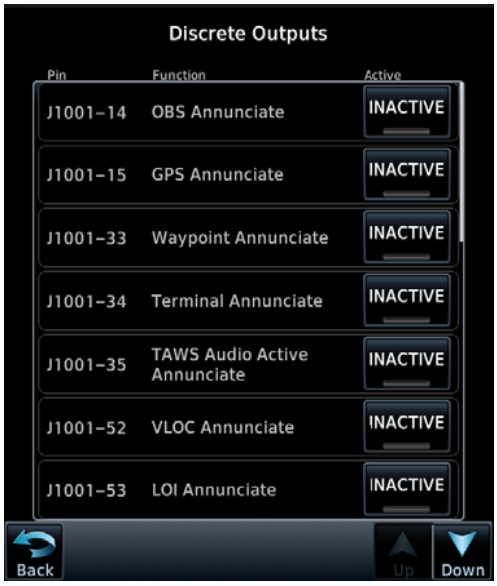


Figure 6-45. Discrete Outputs Page

6.10.5 HSDB Provisional Wiring Checkout

If provisional wiring has been installed for the GTS 8XX, GDU 620, or other Garmin LRU to interface via HSDB, follow the procedure below to ensure it has been installed correctly.

1. Access the GTN Diagnostics page from the Configuration Mode home page.
2. Touch the 'HSDB (Ethernet)' key. The HSDB Diagnostics page, shown in Figure 6-46, will be displayed.
3. Ensure any LRUs connected via HSDB are powered on and properly configured.
4. For each Ethernet port that has HSDB wiring connected to it, ensure that the port status displays 'Connected' and 'Receiving'.
5. If the previous step did not perform correctly, check the electrical connections and configuration setup.

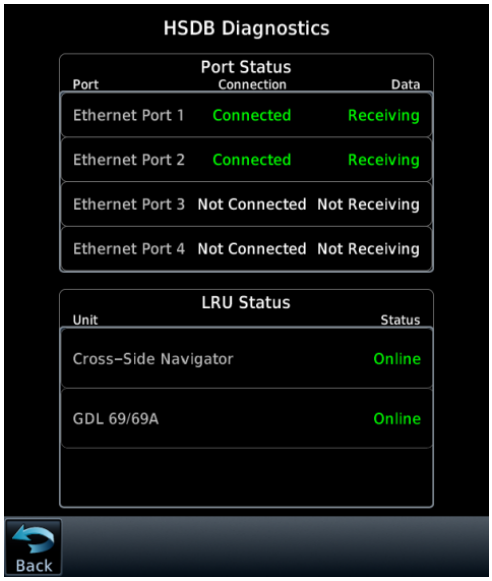


Figure 6-46. HSDB Diagnostics Page

6.10.5.1 Crossfill Check (If Dual GTNs Installed)

Turn on both GTN units in the aircraft. On each GTN unit:

1. Access the Interfaced Equipment page, as shown in Figure 6-7, from the GTN Setup page. Verify that the setting for Cross-Side Navigator is set to 'Present'.
2. Touch the 'Back' key until the Configuration Mode page is displayed.
3. Access the HSDB Port Utilization page, as shown in Figure 6-6, from the GTN Setup page. Touch the 'HSDB (Ethernet)' key and ensure that the ports that are configured as connected, display 'Connected'.
4. Touch the 'Back' key until the Configuration Mode page is displayed.
5. Touch the 'GTN Diagnostics' key.
6. Access the HSDB Port Status page, as shown in Figure 6-46, from the GTN Diagnostics page. Touch the 'HSDB (Ethernet)' key. For the port that the cross-side GTN is connected to, check the Ethernet Port Status and ensure that 'Connected' is displayed under 'Connection' and Receiving' is displayed under 'Data'.
7. If the previous steps do not perform correctly, check the electrical connections and configuration setup.

6.10.6 TAWS Audio Check (For Units with TAWS Only)

NOTE

The audio panel should also be turned on for this test.

The TAWS audio volume has an initial default of 80% of the maximum volume value. The TAWS volume needs to be set so as to ensure that aural alerts are audible under all anticipated noise conditions.

1. Access the Audio configuration page, as shown in Figure 6-47 by touching the 'Audio' key on the GTN Setup page.
2. The selected volume level can be checked by selecting 'Test Sound' and then touching 'Test Tone' from 'Select Test Sound' menu. Touch the white triangle to hear the test message.
3. Evaluate the TAWS audio messages for acceptable volume and intelligibility during both low and high cockpit noise levels (idle descent at low speed and high power at Vmo/Vne).
4. Readjust the volume as needed to ensure the TAWS audio messages will be heard in all anticipated cockpit noise conditions.

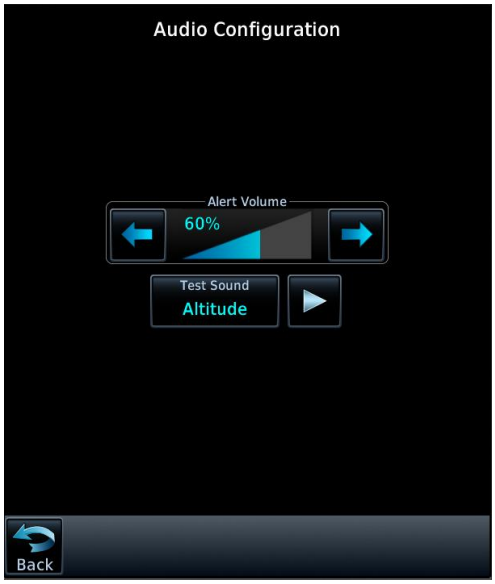


Figure 6-47. Audio Configuration Page

6.10.7 GAD 42 Configuration Page Check

This check verifies that the GTN is interfaced with the GAD 42.

1. Access the GAD 42 Configuration page, as shown in Figure 6-48, by touching the 'GAD 42' key on the External Systems page.
2. Verify that Status is ACTIVE.
3. Change any of the options to a different number.
4. Verify that after changing one of the options the STATUS field changes to SENDING then changes back to ACTIVE. If the entry reverts to the previous number when ACTIVE is displayed, then refer to the latest revision of the GAD 42 Installation Manual (P/N 190-00159-00).

Figure 6-48. GAD 42 Configuration Page

6.10.8 Lighting Bus Interface Check

CAUTION

When 14 VDC or 28 VDC lighting buses are connected to the GTN, connection of the aircraft lighting bus to the incorrect input pins can cause damage to the GTN. Always start this test with the dimming bus at the lowest setting, and slowly increase the brightness. If it is noticed that the LIGHTING level displayed on the GTN does not increase as the lighting is increased in brightness, verify that the wiring is correct before proceeding.

The display and key backlighting on the GTN can track an external lighting/dimmer bus input and use it to vary the display and key backlight levels accordingly. This check verifies that the interface is connected correctly.

1. Access the Lighting Configuration page, as shown in Figure 6-49, by touching the 'Lighting' key on the GTN Setup page.
2. Touch the Source key to change the source to Lighting Bus 1 or 2.
3. Touch the 'Minimum Level' key to set the lighting bus to its minimum setting of 0.05%.
4. Slowly vary the lighting bus level that is connected to the GTN. Verify that the Source Input Level value displayed on the configuration screen tracks the lighting bus setting. Continue to maximum brightness and verify proper operation.

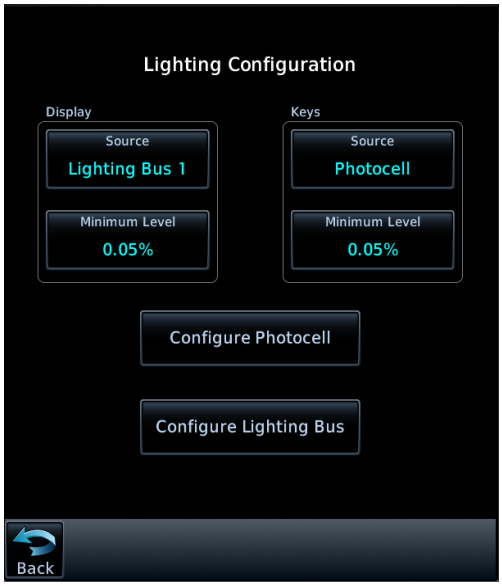


Figure 6-49. Lighting Configuration Page

6.10.9 Altitude Encoder or Air Data Computer Check

The GTN can receive altitude data from an external source. This check verifies that the GTN is receiving data from these sources. Ensure that the GTN is powered on and in configuration mode. If the following steps do not perform correctly, check the electrical connections (Appendix D) and configuration setup (Section 6.6.2) for the interfaced altitude encoder/ADC.

1. Access the Main Data Inputs page, as shown in Figure 6-50, by touching the 'Main Data Inputs' key on the GTN Diagnostics page.
2. If there are multiple altitude sources providing data to the GTN, remove power from all but one source.
3. Verify that Pressure Altitude is being displayed and agrees with the active altitude source.

NOTE

After applying power to an altitude source it may take several minutes to warm up. During the warm-up period the Pressure Altitude display on the GTN will be dashed out.

4. If there are multiple altitude sources, remove power from the currently active source and apply power to another source that has not been checked.
5. Repeat steps 2-4 until all available sources have been checked.

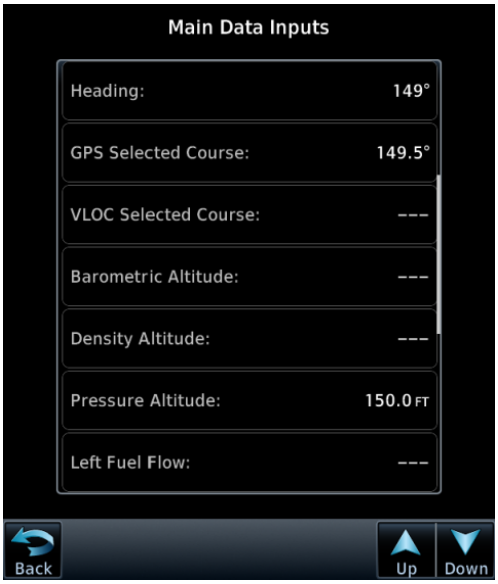


Figure 6-50. Main Data Inputs Page

6.10.10 AHRS/IRU Interface Check

The GTN can receive heading data from an external source. This check verifies that the GTN is receiving data from these units. Ensure the GTN is powered on and in configuration mode. If the following steps do not perform correctly, check the electrical connections and configuration setup for the interfaced AHRS/IRU.

1. Access the Main Data Inputs page, as shown in Figure 6-50, by touching the 'Main Data Inputs' key on the GTN Diagnostics page.
2. Scroll to the Magnetic Heading Data Display on the list.

NOTE

If a Sandel EHSI or an ARINC 429 EFIS is also installed, ensure that it is turned off so that it does not supply heading to the GTN. Verify that the HDG field displays valid heading data.

3. Remove power from the heading source and verify that the magnetic heading field is dashed out.

6.11 Ground Checks (Normal Mode)

For the following checks, cycle power on the GTN and power it up in normal mode.

6.11.1 Display of Self-Test Data

Following normal power-up, the database page is displayed, followed by the Instrument Panel Self-Test page. Touching 'Continue' displays the Instrument Panel Self-Test page. During this time, the electrical outputs are activated and set to the values listed below. Touch 'Continue' to acknowledge the self test page. This is not a required check, although this page can be useful for troubleshooting installation problems.

Parameter	Self-Test Value
Course Deviation	Half-scale left deviation, TO indication, flag pulled
Glideslope/Vert. Deviation	Half-scale up deviation, flag pulled
Annunciators	All On
Bearing to Waypoint (RMI)	135°
Selected Course (OBS)	The GTN displays the OBS value (149.5° if interfaced to an HSI with driven course pointer).
Desired Track	149.5° (Displayed as 150°)
Items below are not displayed on the INSTRUMENT PANEL SELF-TEST page	
Distance to Go	10.0 nautical miles
Time to Go	4 minutes
Active Waypoint	"GARMN"
Groundspeed	150 knots
Present Position	N 39°04.05', W 94°53.86'
Waypoint Alert	Active
Phase of Flight	En Route
Message Alert	Active
Leg/OBS Mode	Leg Mode
GPS Integrity	Invalid
Roll Steering (if applicable)	Flight Director commands 0° bank (level flight) for 5 seconds; commands increasing right bank at 1°/second for 5 seconds; commands 5° right bank for 5 seconds; commands decreasing right bank at 1°/second for 5 seconds, until command is 0° bank again. This cycle repeats continuously.

6.11.2 Signal Acquisition Check

NOTE

All other avionics should be turned off at the start of this test, with the GTN powered on in normal mode.

Ensure the GTN is able to acquire sufficient satellites to compute a GPS position. From the Home page, touch the 'System' key and then touch the 'GPS Status' key. Under GPS Solution, ensure that a 3D Fix or 3D Diff Fix is obtained. If the unit is unable to acquire satellites, move the aircraft away from obstructions which might be shading GPS reception. If the situation does not improve, check the GPS antenna installation.

NOTE

After installation, the initial acquisition of position can take up to 20 minutes. Subsequent acquisitions will not take that long.

Once GPS position information is available, perform the following steps:

1. On the GPS Status page, verify that the LAT/LON agree with a known reference position.
2. While monitoring the GPS Status Page, turn on other avionics one at a time and check the GPS signal reception to make sure it is not affected (no significant signal degradation).
3. Before proceeding with the VHF COM interference check, ensure that any connected equipment is transmitting and/or receiving data from the GTN and is functioning properly.

6.11.3 VHF COM Interference Check

NOTE

The interference check must be completed on all IFR installations.

NOTE

It is known that certain non-aviation radios, including marine transceivers, can interfere with civil aviation navigation and surveillance equipment including the Garmin GTN. When installing GTN equipment, it is the responsibility of the installer to ensure that the GTN modification is compatible with all previous aircraft modifications. Garmin recommends that whenever a GTN is installed in an aircraft that has been modified with non-aviation radios, particular care should be exercised to verify that these do not interfere with proper function of the GTN. Special care should also be taken to ensure that there is no interference with the GTN if non-aviation radios are installed in an aircraft after a GTN has been installed. If interference is found, it can be addressed by relocating antennas, rerouting cables, using filters to attenuate unintentional harmonic frequency transmissions, or using various other techniques for elimination of the interference. It may be necessary to remove or replace the interfering radio with a model that does not interfere with the proper functioning of the GTN.

If you are testing a transmitter from a non-aviation device, each frequency must be verified by transmitting for at least 30 seconds on each channel.

Once the Signal Acquisition Test has been completed successfully, perform the following steps:

1. View the GPS Status Page and verify that at least 7 satellites have been acquired by the GTN.
2. Verify that the GPS "LOI" flag is out of view.
3. Select 121.150 MHz on the COM transceiver to be tested.
4. Transmit for a period of 35 seconds.
5. Verify that the GPS "LOI" flag does not come into view.
6. Repeat steps 4 and 5 for the following frequencies:

25 kHz COM CHANNEL SPACING

121.150 MHz	131.225 MHz
121.175 MHz	131.250 MHz
121.200 MHz	131.275 MHz
121.225 MHz	131.300 MHz
121.250 MHz	131.325 MHz
131.200 MHz	131.350 MHz

NOTE

For VHF radios with 8.33 kHz channel spacing, include the following frequencies in addition to those listed above.

8.33 kHz COM CHANNEL SPACING

121.185 MHz	130.285 MHz
121.190 MHz	131.290 MHz

7. Repeat steps 3 through 6 for all remaining COM transceivers installed in the aircraft.
8. If aircraft is TCAS-equipped, turn on the TCAS system and verify that GPS position remains valid (if position is lost, the status on the GPS Status page will change to "ACQUIRING").
9. If aircraft is SATCOM-equipped, use the SATCOM system and verify that GPS position remains valid (if position is lost, the status on the GPS Status page will change to "ACQUIRING").

If the GPS "LOI" flag comes into view, see 4.11.1 for options to improve performance.

6.11.4 VHF NAV Checkout (GTN 750 Only)

While on the Map page, touch the CDI key on the display to select VOR/LOC mode, which is indicated by a green 'VLOC' annunciation on the bottom center of the display. Check the VOR reception with ground equipment, operating VOT or VOR, and verify audio and Morse code ID functions (if possible). Tune a Localizer frequency and verify the CDI needle and NAV flag, and VDI needle and GS flag operation.

6.11.5 VHF COM Checkout (GTN 750 Only)

6.11.5.1 Antenna Check

If desired, the antenna VSWR can be checked using an inline wattmeter in the antenna coax using frequencies near both ends of the band. The VSWR should be < 2:1. A VSWR of 2:1 will cause a drop in output power of approximately 12%.

6.11.5.2 Receiver/Transmitter Operation

Tune the unit to a local VHF frequency and verify the receiver output produces a clear and understandable audio output. Verify the transmitter functions properly by contacting another station and getting a report of reliable communications.

6.11.6 TAWS System Check (For Units with TAWS Only)

While on the ground, turn on the GTN following normal power-up procedures. Also turn on the audio panel.

NOTE

A 3D GPS position fix is required to conduct this check.

1. Touch the 'Terrain' key.
2. On the Terrain page, touch the 'Menu' key and select 'Test TAWS'.
3. Wait until the TAWS self-test completes (10-15 seconds) to hear the TAWS system status aural message.
    - The aural message "TAWS System Test OK" will be annunciated if the TAWS system is functioning properly.
    - The aural message "TAWS System Failure" will be annunciated if the TAWS system is NOT functioning properly.

If no audio message is heard, then a fault exists within the audio system and the TAWS capability must be considered non-functional.

6.12 Interface Checkout

This section describes the checks that must be carried out to verify that systems interfacing to the GTN are communicating properly. Only those interfaces that are connected to the GTN must be verified.

6.12.1 Honeywell (Bendix/King) EFS40/50 Interface Check

If a Honeywell EFS40/50 has been connected to the GTN, the interface should be verified as described in this section.

1. Cycle power to GTN #1 and acknowledge the prompts until it gets to the Instrument Panel Self Test page (see Section 6.11.1).
2. Ensure that GPS1 data is displayed by pressing the "1-2" key on the EFS40/50 control panel.
3. While the GTN is displaying the self test page, verify that the EFS40/50 is displaying data from the GPS source. Note that vertical deviation will not be displayed.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Active Waypoint: GARMN
    - Vertical Deviation: Half-scale up deviation (only if installation is set up to display GPS vertical deviation)
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Using a VOR test set verify that the CDI deviation on the EFS40/50 is displayed correctly.
6. Cycle power to the second GTN and acknowledge the prompts until it gets to the self test page.
7. Switch to GPS2 data by pressing the "1-2" key on the EFS40/50 control panel and repeat steps 3 through 5 with the second GTN.

6.12.2 Sandel SN 3308 Interface Check

If a Sandel EHSI has been connected to the GTN, the interface should be verified as described in one of the following sections, as appropriate for the installation.

6.12.2.1 One GTN/One SN 3308

1. Cycle power to the GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 6.11.1).
2. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

3. While the GTN is displaying the self test page, verify that the SN3308 is displaying the following data from the GPS source.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Vertical Deviation: Half-scale up deviation, flag pulled
    - Active Waypoint: GARMN
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Acknowledge the self test on the GTN by touching the 'Continue' key.
6. Select VOR/LOC on the GTN and verify that the SN3308 displays NAV 1 or NAV 2 (depending on what navigation source the GTN is).
7. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.

6.12.2.2 Two GTNs/One SN3308

The checkout for two GTNs also applies to one GTN 6XX and one GTN 7XX.

1. Remove power from GTN #2.
2. Cycle power to the GTN #1 and acknowledge the prompts until it gets to the self test page (see Section 6.11.1).
3. Select GPS1 as the navigation source by pressing the NAV key on the SN3308.
4. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

5. While GTN #1 is displaying the self test page, verify that the SN3308 is displaying the following data from GPS1.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Vertical Deviation: Half-scale up deviation, flag pulled
    - Active Waypoint: GARMN
6. On GTN #1 verify that an OBS value is displayed (and not dashed out).
7. Acknowledge the self test on GTN #1 by touching the 'Continue' key.
8. Select VOR/LOC on GTN #1 and verify that the SN3308 displays NAV 1 or NAV 2 (depending on what navigation source the GTN is).
9. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.
10. Remove power from GTN #1 and apply power to GTN #2 and acknowledge the prompts until it gets to the self test page (see Section 6.11.1).
11. Select GPS2 by pressing the NAV key on the SN3308.
12. Repeat steps 5-9 with the GTN #2 with power removed from GTN #1.

6.12.2.3 Two GTNs/Two SN3308s

1. Remove power from GTN #2.
2. Cycle power to GTN #1 and acknowledge the prompts until it gets to the Instrument Panel Self Test page.
3. Select GPS1 as the navigation source by pressing the NAV key on the SN3308. Verify that GPS1 is displayed on the SN3308.
4. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

5. While GTN #1 is displaying the self test page, verify that the SN3308 is displaying the following data from GPS1.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Vertical Deviation: Half-scale up deviation, flag pulled
    - Active Waypoint: GARMN
6. On GTN #1 verify that an OBS value is displayed (and not dashed out).
7. Acknowledge the self test on GTN #1 by touching the 'Continue' key.
8. Select VLOC on GTN #1 and verify that the SN3308 displays NAV 1 or NAV 2 (depending on which navigation source the GTN is).
9. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.
10. Remove power from GTN #1 and apply power to GTN #2 and acknowledge the prompts until it gets to the Instrument Panel Self Test page
11. Select GPS2 by pressing the NAV key on the SN3308.
12. Repeat steps 4-9 with the second GTN.
13. Perform the same procedure for the second SN3308. Ensure that SN3308 #2 is receiving valid heading by ensuring the vertical deviation indication is being displayed.
14. Repeat steps 5-12 for SN3308 #2.

6.12.2.4 Sandel SN3500/4500 Interface Check

If a Sandel SN3500/4500 EHSI has been connected to the GTN, the interface should be verified as described in this section.

1. Cycle power to the GTN and acknowledge the prompts until it gets to the self test page (see Section 6.11.1).
2. Ensure that the SN3500/4500 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3500 is receiving valid heading.

3. While the GTN is displaying the self test page, verify that the SN3500/4500 is displaying data from the GPS source.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Vertical Deviation: Half-scale up deviation, flag pulled
    - Active Waypoint: GARMN
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Acknowledge the self test on the GTN by touching the 'Continue' key.
6. Select VOR/LOC on the GTN and verify that the SN3308 displays NAV 1 or NAV 2 (depending on what navigation source the GTN is).
7. Ensure that the NAV1 (or NAV2) indication does not have a red line through it.

6.12.3 EHSI Deviation Scaling (If HSI/CDI Is Driven by the GTN via Serial Data)

If the GTN has a serial connection to an EFIS display, proper scaling of the EFIS CDI and VDI must be verified.

1. Cycle power to the GTN and acknowledge the prompts until it gets to the Instrument Panel Self Test page (see Section 6.11.1).
2. With the Instrument Panel Self Test page displayed on the GTN, look at the EHSI/EFIS and verify that the lateral deviation is not flagged and is half-scale left.
3. With the Instrument Panel Self Test page displayed on the GTN, look at the EHSI/EFIS and verify that the vertical deviation is not flagged and is half-scale up.

NOTE

If the deviations are not as described, the EHSI/EFIS does not scale the GTN deviations properly and cannot be certified for GPS-based guidance. Contact Garmin for further assistance.

6.12.4 ARINC 429 Traffic System Interface Check

If a Garmin GTS 8XX Traffic system, L3 Communications SKY497/SKY899 SkyWatch® sensor or a Honeywell (Bendix/King) KTA 810 TAS/KMH 820 IHAS has been connected to the GTN via ARINC 429, the traffic interface should be verified as described in this section.

1. Go to the Traffic page on the GTN from the home page.
2. Verify that NO DATA is not displayed in yellow on the center of the traffic page.
3. Verify that the traffic system mode can be changed from STBY to OPER.
4. Switch the traffic system mode to STBY, and then run the traffic self test from the Menu.
5. Verify that the traffic system executes a self test and a self-test pattern is displayed on the GTN traffic display.

6.12.5 Stormscope® Interface Check

If an L3 Communications WX-500 Stormscope has been connected to the GTN, the Stormscope interface should be verified as described in this section.

1. Got to the Weather page by touching the 'Weather' key on the Home page.
2. Touch the 'Stormscope' key.
3. Verify that LIGHTNING FAILED is not displayed in yellow on the center of the page.

6.12.6 GMX 200/MX20 Interface Check

If a Garmin GMX 200 or MX20 has been connected to the GTN, the interface should be verified as described in this section.

1. Ensure that the GTN has a valid GPS position.
2. Create and activate a flight plan on the GTN.
3. Verify that the RTE and POS data flags are not displayed on the GMX 200/MX20.
4. Verify that the flight plan is displayed on the GMX 200/MX20 using the flight plan (FPL) function.

6.12.7 GDL 69/69A Interface Check

If a Garmin GDL 69 has been connected to the GTN, the interface should be verified as described in Section 6.12.7.1. If a Garmin GDL 69A has been connected to the GTN, the interface should be verified as described Sections 6.12.7.1 and 6.12.7.2. Each of these procedures involves verifying that the satellite signal is acquired and tracked. Locate the aircraft where there is a clear view of the southeastern or southwestern sky. XM Satellite Radio satellites are located above the equator over the eastern and western coasts of the continental United States.

NOTE

The following sections only verify the correct interface of GDL 69/69A to the GTN. It does not activate the GDL 69 XM data link radio. Complete instructions for activating the XM data link radio can be found in document 190-00355-04, GDL 69/69A XM Satellite Radio Activation Instructions.

6.12.7.1 XM® Satellite Radio Weather Checkout Procedure

1. With the GTN running in the normal mode, go to the External LRUs page (in the System page group) then touch the 'More Info' key next to the GDL69.
2. Verify that the Data Radio ID field has a valid ID. For a GDL 69A, the Audio Radio ID field should also display a valid ID.
3. Verify that at least one subscribed weather product turns green on the GDL 69 status page. This may take several minutes. This will indicate that the weather products are being received.

During XM activation, "Detecting Activation" will be displayed in the SERVICE CLASS field on the XM Information page, and "Aviator" or "Aviator Pro" will be displayed once the XM signal is detected.

6.12.7.2 XM® Satellite Radio Audio Checkout Procedure

1. Go to the Music page from the Home page.

NOTE

If the XM Satellite Radio audio subscription has not been activated, audio is available only on Channel 1. If the audio subscription has been activated, audio should be available on multiple channels.

2. Ensure that the GDL 69A audio is not muted.
3. Set audio panel to route music to the headsets.
4. Verify that audio can be heard over the headsets. Adjustment of the volume may be required.

6.12.8 VOR RMI/OBI Interface Check

The GTN RMI/OBI output can be used to drive an RMI (or OBI) navigation indicator. This check verifies that the RMI/OBI is receiving data from the GTN. If the following steps do not perform correctly, check the electrical connections and configuration setup.

NOTE

The aircraft heading system must be operating properly in order for the RMI needle to point correctly.

1. Apply power to the GTN.
2. If installed, set the RMI select switch to the VOR/LOC position.
3. Tune a local VOR station, or use a simulated signal from an approved VOR Test System.
4. Verify that the RMI needle swings and points toward the VOR station.

6.12.9 DME Interface Check (GTN 750 Only)

If the GTN is set up to remotely channel a DME, verify the interface.

1. Select a VOR/ILS channel that corresponds to (1) a DME station within a 40 nautical mile range, or (2) the frequency of a DME ground tester.
2. Verify that the DME locks on to the signal and a valid distance, ground speed and time are displayed.
3. Tune an invalid VOR station. Verify that the DME changes to an invalid station.

6.12.10 Magnetic Compass Check

A compass swing should be carried out at completion of installation in accordance with AC 43.13-1B, chapter 12, section 3, paragraph 12-37.

6.13 Flight Checks

All GTN functions that cannot be adequately tested on the ground will require a flight check. Even if all functions can be verified on the ground, a flight check is recommended as final installation verification. Verify system operation as described in the following sections.

NOTE

The analog deviation (LEFT/RIGHT and UP/DOWN), TO/FROM, and FLAG (lateral and vertical) outputs to a CDI or HSI should be verified in flight with potential sources of electrical noise such as autopilot, flaps, gear, heater blowers, etc. operating. Lateral deviation and flags may be checked with either GPS or VOR/ILS, and vertical deviation and flags must be checked with Glideslope. Verify that the flags are hidden at the correct times, and that the flag is in view at the correct times.

6.13.1 GPS Flight Check

1. Verify that GPS position is not lost during normal aircraft maneuvering (e.g. bank angles up to 30 degrees and pitch angles associated with take-off, departures, approaches, landing and missed approaches as applicable). If GPS position is lost, a "Loss of GPS Navigation" message will be displayed.
2. Enter and activate a flight plan on the GTN by pressing the Direct-To button and entering a waypoint. Fly the flight plan and verify that the display of flight plan data is consistent with the CDI indication (deviation, TO/FROM…) in the pilot's primary field of view.

6.13.2 VHF COM Flight Check (GTN 750 Only)

To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least 50 nautical miles. Contact a ground station in close proximity. Press the COM volume knob to select manual squelch and listen for any unusual electrical noise, which would increase the squelch threshold. If possible, verify the communications capability on both the high, low and mid bands of the VHF COM band. It may be required by the governing regulatory agency to verify operation of the COM transmitter and receiver at the extents of a ground facility's service volume (e.g., FAA AC 23-8A).

6.13.3 VOR Flight Check (GTN 750 Only)

1. Tune a local VOR station within 50 miles.
2. Verify the audio IDENT and voice quality have no objectionable electrical interference such as magneto noise.
3. Verify the Morse code decoder IDs the station (95% probability).
4. Fly to and from the station.
5. Verify NAV flag, TO/FROM flag, and CDI are operational.

It may be required by the governing regulatory agency to verify operation of the VOR receiver at the extents of a ground facility's service volume (e.g., FAA AC 23-8A).

6.13.4 ILS Flight Check (GTN 750 Only)

1. Tune an ILS at the local airport.
2. Verify the AUDIO IDENT and AUDIO QUALITY have no objectionable electrical interference such as magneto noise.
3. Verify the Morse code decoder IDs the station (95% probability).
4. Fly the approach.
5. Verify NAV flag, GS flag, and CDI and VDI are operational.

6.13.5 Autopilot Flight Check

1. Enter and activate a flight plan on the GTN. For the GTN, ensure that GPS is selected on the CDI. Engage the autopilot in the GPSS mode, if available. Verify that the autopilot flies the course.
2. Disengage the autopilot and fly off course. Re-engage the autopilot (in GPSS mode) and verify that it correctly intercepts the course and continues to fly it.
3. Turn off the autopilot GPSS but leave the autopilot engaged in NAV mode. Verify that it maintains the current course.
4. (GTN 750 Only): Reselect the GPSS mode on the autopilot. Press the CDI key to select VLOC on the GTN. Verify that the GPSS mode disengages.
5. For autopilots that provide vertical guidance, fly a vertically coupled LPV approach. Ensure the autopilot correctly flies the approach.
6. Deviate from the glideslope by using control wheel steering, or by disengaging the autopilot. Ensure the autopilot correctly follows the approach guidance once re-engaged.

6.13.6 TAWS Audio Flight Check (TAWS-equipped Units Only)

NOTE

The TAWS volume needs to be loud enough to ensure that aural alerts are audible under all anticipated noise environmental conditions. This check verifies that TAWS aurals can be heard during flight, but the ambient noise conditions under which it is verified are not worst-case. Consequently, the "Five Hundred" callout should be louder than is required for the conditions under which it is verified.

1. Set up for an approach to the airport.
2. During the approach, at approximately 500 ft AGL, the "Five Hundred" callout will occur. Verify that "Five Hundred" can be easily heard and understood.

6.14 Database Check

Check the navigation database to ensure it is current. The database information is displayed during the unit display start-up sequence. To check the database:

1. Turn off the GTN and then turn it on. The GTN will go through its normal start-up sequence.
2. Wait for the Navigation Database page to be displayed.
3. Verify that the expiration date displayed has not passed.

If the database has expired, then remove the SD card and update the navigation database as described in Section 6.15. Also see Section 1.6.

6.15 Data Card Replacement

CAUTION

Handle the data cards carefully. Do not touch the connector edge of the data card.

To replace the data card:

1. Ensure that the GTN is turned off.
2. Remove the data card by pressing the card until it disengages and then pull the card to extract from the unit.
3. With the label facing right, insert the new data card by pushing the card straight into the slot and press until it is inserted fully.

6.16 Software Loading

The GTN comes pre-loaded with software. However, to ensure that the latest software is loaded it is recommended that software from a current GTN Downloadable Software SD Card, P/N 010-01000-( ), be loaded into the GTN. For dual GTN installations the software loading procedures below must be carried out on each GTN. See Section 6.4 for instructions pertaining to entering configuration mode.

6.16.1 Creating a GTN Software Loader Card

NOTE

The application to create a loader card requires Windows 2000, XP, Vista, or Windows 7. There is no Mac support at this time.

1. Go to the Dealer Resource section of www. garmin.com.
2. Download the GTN System software to your PC.
3. Ensure that you have an SD card reader connected to the PC. Insert the GTN Downloadable Software SD Card in the card reader.
4. Run the executable file that was downloaded and follow the prompts on the screen to create the software loader card.
5. After the card has been created, select Finish to complete the process.
6. Eject the card from the card reader. The GTN software loader card is now ready to use.

6.16.2 GTN Software Loading

1. Remove power from the GTN.
2. Insert the correct GTN Loader Card into the SD card slot.
3. Restore power to the GTN. The Configuration Mode page should now be displayed.
4. Touch the 'Updates' key to display the software updates that are available. The updates page displays the version that is installed on the unit and the version installed on the loader card.
5. Verify that the available GTN software updates are being displayed by ensuring that 'GTN Software Updates' is displayed on the key in the upper left corner of the display.
6. To update the GTN with all software available, touch the 'Select All' key **or** touch to select or deselect which software to update. A green checkmark will be displayed next to each item of the list that will be updated.
7. To begin the software update, touch the 'Update' key on the bottom of the display.
8. The GTN will display the prompt, 'Start GTN Software Updates? Touch 'OK' to allow the GTN to go through the update process.

Figure 6-51. Updates Page

9. When the updates are finished, the GTN will display 'Update Complete!'. When finished, remove power from the GTN and remove the software loader card. Reinsert the database card into the SD card slot.

6.17 Documentation Checks

6.17.1 Airplane Flight Manual Supplement

Ensure that the Airplane Flight Manual Supplement (AFMS) is completed and inserted in the Airplane Flight Manual (AFM) or Pilot's Operating Handbook (POH).

1. Fill in the required airplane information in the AFMS.
2. Fill in the appropriate checkbox in the Limitations section of the AFMS corresponding to the autopilot coupling limitations.

NOTE

The GPS SELECT setting will determine if the transition into approach mode is automatic or requires pilot acknowledgement of a message prompt.

3. Fill in the appropriate checkbox in the Normal Procedures section of the AFMS corresponding to the autopilot mode transitions.
4. Insert the completed AFMS into the AFM or POH.

7 PERIODIC MAINTENANCE

7.1 Equipment Calibration

No scheduled servicing tasks are required on the GTN 725 or GTN 750.

7.2 VOR Checks

Refer to CFR 14 paragraph 91.171. Every 30 days verify the limits of the permissible indicated bearing error.

7.3 Cleaning

The front bezel, keypad, and display can be cleaned with a microfiber cloth or with a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.

7.4 Battery Replacement

WARNING

This product contains a lithium battery that must be recycled or disposed of properly. Battery replacement and removal must be performed by professional services.

The GTN includes an internal battery that will last 5 to 8 years. The battery is used for internal time clock and GPS system information. Regular planned replacement is not necessary. The GTN will display a "Low Battery" and "Unit Needs Service" message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

If the battery is not replaced and becomes totally discharged, the GTN will remain fully operational, but the GPS signal acquisition time will be increased. There is no loss of function or accuracy of the GTN with a dead battery.

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Appendix A ENVIRONMENTAL QUALIFICATION FORM

For RTCA/DO-160F Environmental Qualification Forms (EQFs) visit the Dealers Only site on http://www.garmin.com. The GTN 725 and GTN 750 use the same EQF, part number 005-00533-13.

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Appendix B GTN DATA FORMAT

B.1 RS-232 Aviation Data Format

B.1.1 Electrical Interface

The output signals are compatible with RS-232C. Data is generated at 9600 baud with a word length of 8 bits, one stop bit, and no parity.

B.1.2 General Output Format

The GTN RS-232 data has the following general format:

STX - ASCII start-of-text character (02 hex)

t1s - Type 1 output sentences (see following paragraphs for description)

t2s - One or more type 2 output sentences (see following paragraphs for description)

ETX - ASCII end-of-text character (03 hex)

B.1.3 Output Sentence Type 1

The Type 1 output sentences have the following general format:

id - item designator (single ASCII alphabetic character)

dddd - item data (1 to 10 printable ASCII characters)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)*

Each Type 1 sentence is output by the GTN approximately once every second.

The track, desired track, and bearing to waypoint angles, and the magnetic variation are output according to the current mode of the GTN (automatic magnetic heading, magnetic variation computed at last known position; true heading, magnetic variation of E00.0°; or user-defined magnetic heading, magnetic variation as entered by user).

Table B-1 describes the Type 1 output sentence item designator (id) and item data (dddd) fields. If data for these sentences is invalid or unavailable, dashes ("-") are used to fill in all non-blank character positions.

Table B-1. Type 1 Output Sentence Format

Ident (1 byte)	Data (10 bytes) 1 2 3 4 5 6 7 8 9 0	Description
z	a a a a a	Current GPS altitude in feet *
A	s d d m m h h	Current latitude, where: s - N (north) or S (south) dd - degrees mm - minutes hh - hundredths of minutes
B	s d d d m m h h	Current longitude, where: s - E (east) or W (west) ddd - degrees mm - minutes hh - hundredths of minutes
C	d d d	Track in whole degrees
D	s s s	Ground speed in knots
E	d d d d d	Distance to waypoint in tenths of nautical miles
G	s n n n n	Cross track error, where: s - L (left) or R (right) of course nnnn - error in hundredths of nautical miles
I	d d d d	Desired track in tenths of degrees
K	c c c c c	Destination waypoint identifier (will be blank filled on right if less than 5 characters in identifier)
L	d d d d	Bearing to destination waypoint in tenths of degrees
Q	s d d d	Magnetic variation, where: s - E (east) or W (west) ddd - tenths of degrees
S	- - - - f	NAV valid flag status, where: f - N (NAV flagged) or - (NAV valid)
T	- - - - - - - - - -	Warnings status, only data transmitted are dashes (-). Used to indicate end of Type 1 sentences.
l (lower case Lima)	d d d d d d	Distance to destination waypoint in tenths of nautical miles.

* The altitude is not output if the RS-232 port is configured as “Aviation Output 2.”

* The line feed character is not output if the RS-232 port is configured as “Aviation Output 2.”

B.1.4 Output Sentence Type 2

The GTN Type 2 output sentence has the following general format:

id - item designator (3 ASCII characters)

seq - sequence number (1 binary byte)

wpt - waypoint identifier (5 ASCII characters)

lat - waypoint latitude (3 binary bytes)

lon - waypoint longitude (4 binary bytes)

mvar - magnetic variation at waypoint (2 binary bytes)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)

Each waypoint in the route being navigated by the GTN has a Type 2 sentence output by the GTN approximately once every second.

If no route is being navigated by the GTN (i.e., the active route is empty), the following Type 2 sentence is output approximately once every second:

id - item designator (3 ASCII characters; route sequence number is "01")

seq - sequence number (1 binary byte; last waypoint flag is set; route sequence number is 1)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)

Table B-2 describes the Type 2 output sentence item designator (id), sequence number (seq), waypoint identifier (wpt), waypoint latitude (lat), waypoint longitude (lon), and magnetic variation at waypoint (mvar) fields.

Table B-2. Type 2 Output Sentence Format

Field	Byte	Format 7 6 5 4 3 2 1 0	Description
id	1 2-3		ASCII character 'w' (77 hex) Two ASCII numeric characters representing route sequence number of waypoint (01 to 31)
seq	1	x l a n n n n n	x - undefined l - 1 if last waypoint in route a - 1 if active to waypoint nnnnn - route sequence number of waypoint (unsigned binary)
wpt	1-5		Destination waypoint identifier (will be blank filled on right if less than 5 characters in identifier)
lat	1 2 3	s d d d d d d d x x m m m m m m x h h h h h h h	s - 0 (north) or 1 (south) ddddddd - latitude degrees (unsigned binary) xx - undefined mmmmmm - latitude minutes (unsigned binary) x - undefined hhhhhhh - hundredths of latitude minutes (unsigned binary)
lon	1 2 3 4	s x x x x x x x d d d d d d d d x x m m m m m m x h h h h h h h	s - 0 (east) or 1 (west) xxxxxxx - undefined ddddddd - longitude degrees (unsigned binary) xx - undefined mmmmmm - latitude minutes (unsigned binary) x - undefined hhhhhhh - hundredths of latitude minutes (unsigned binary)
mvar	1-2		Two's complement binary in 16ths of degrees. Easterly variation is positive. MSB output first.

B.2 GTN RS-232 Fuel/Air Data Input Format

B.2.1 Electrical Interface

The input signals are compatible with RS-232C. Data is input at 9600 baud with a word length of 8 bits, one stop bit, and no parity. One message is received per second.

B.2.2 Shadin Altitude Sentence

The Garmin GTN is capable of receiving the following 17-byte message from Shadin Altitude Encoders, Altitude Serializers, and Altitude Converters:

RMS<sp><+/->12345T<+/->12ul<CR>

Where:

RMS	ASCII characters
<sp>	space (0x20)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
12345	altitude in feet
T	ASCII character
<+/->	sign indicator
12	sensor temperature
ul	checksum of bytes 1 through 14 in hex ASCII (i.e., "FA")
<CR>	carriage return (0x0d)

Note: Checksum is calculated by adding each byte in the message (1 through 14).

B.2.3 Icarus Altitude Sentence

The Garmin GTN is capable of receiving the following 10-byte message from the Icarus Altitude Serializer:

ALT<sp>12345<CR>

Where:

ALT	ASCII characters
<sp>	space (0x20)
12345	altitude in feet
<CR>	carriage return (0x0d)

B.2.4 Shadin Fuel Flow Sentence

The Garmin GTN is capable of receiving the following 55-byte message from the Shadin Fuel Flow Indicator:

<STX>K0543.2<sp>0100.0<sp>0040.0<sp>0060.0<sp>0123.4<sp>0045.4<sp>0078.0<sp>123<ETX>

Where:

<STX>	start-transmit character (0x02)
K	units designation (i.e., Gallons, Liters, Kilograms, B[pounds])
0543.2	total fuel remaining (i.e., ASCII-coded decimal format: 0x30, 0x35, 0x34, 0x33, 0x2e, 0x32)
<sp>	space (0x20)
0100.0	fuel flow rate, total (formatted as for total fuel remaining)
0040.0	fuel flow rate, engine one (or asterisks["******"], in the case of single engine aircraft)
0060.0	fuel flow rate, engine two (asterisks, in the case of single engine aircraft)
0123.4	fuel used, total
0045.4	fuel used, engine one (asterisks, in the case of single engine aircraft)
0078.0	fuel used, engine two (asterisks, in the case of single engine aircraft)
123	checksum (of bytes 2 through 51)
<ETX>	end-transmit character (0x03)

Note: Checksum is calculated by adding each byte in the message (2 through 51), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

B.2.5 ARNAV/EI Fuel Flow Sentence

The Garmin GTN is capable of receiving the following 13-byte message from the ARNAV or Electronics International (“EI”) Fuel Flow Indicators:

<STX>G0245100550<ETX>

Where:

<STX>	start-transmit character (0x02 hex)
G	units designation (i.e., Gallons, Imperial gallons, Liters, Kilograms, B[pounds])
0245	total fuel remaining in reverse order (i.e., ASCII-coded decimal format: 0x30, 0x32, 0x34, 0x35)
1	fuel remaining checksum (modulo 10 sum of four "total fuel remaining" digits)
0055	total fuel flow rate in reverse order
0	fuel flow checksum
<ETX>	end-transmit character (0x03)

Note: Fuel remaining and fuel flow are [∗ 10] when units designation is gallons or imperial gallons. For example, 0245 gallons indicates 542 gallons; 0245 liters indicates 5420 liters. Checksum is the modulo 10 sum of the four fuel flow decimal digits, converted to an ASCII numerical character (e.g., checksum for "5678" would be ASCII "6").

B.2.6 Shadin Fuel/Air Data Computer Sentence

The Garmin GTN is capable of receiving the following message strings from the Shadin Fuel/Air Data or Air Data Computer:

SHADIN "z" FORMAT

<STX>

ZA012<CR><LF>	"ZA" (ASCII characters); "012" represents indicated Air Speed (knots)
ZB345<CR><LF>	"ZB" (ASCII characters); "345" represents true Air Speed (knots)
ZC678<CR><LF>	"ZC" (ASCII characters); "678" represents Mach Speed (thousandths)
ZD<+/->9012<CR><LF>	"ZD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)
ZE<+/->3456<CR><LF>	"ZE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)
ZF<+/->78<CR><LF>	"ZF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)
ZG<+/->90<CR><LF>	"ZG" (ASCII characters); sign; "90" represents true air temperature (Celsius)
ZH123<CR><LF>	"ZH" (ASCII characters); "123" represents wind direction (degrees from north)
ZI456<CR><LF>	"ZI" (ASCII characters); "456" represents wind speed (knots)
ZJ<+/->78<CR><LF>	"ZJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)
ZK<+/->901<CR><LF>	"ZK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)
ZL234<CR><LF>	"ZL" (ASCII characters); "234" represents heading (degrees from north)
ZM5678<CR><LF>†	"ZM" (ASCII characters); "5678" represents fuel flow, right (tenths gallons/hour)
ZN90123<CR><LF>†	"ZN" (ASCII characters); "90123" represents fuel used, right (tenths gallons)
ZO4567<CR><LF>†	"ZO" (ASCII characters); "4567" represents fuel flow, left (tenths gallons/hour)
ZP89012<CR><LF>†	"ZP" (ASCII characters); "89012" represents fuel used, left (tenths gallons)
ZQ345<CR><LF>	"ZQ" (ASCII characters); "345" represents error log/reason indicator
ZR678<CR><LF>	"ZR" (ASCII characters); "678" represents checksum

<ETX>

Where:

<STX>	start-transmit character (0x02)
<CR>	carriage-return character (0x0d)
<LF>	line-feed character (0x0a)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
<ETX>	end-transmit character (0x03)

† Not available from Air Data Computer

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

SHADIN "G" FORMAT

<STX>

GA012<CR><LF>	"GA" (ASCII characters); "012" represents indicated Air Speed (knots)
GB345<CR><LF>	"GB" (ASCII characters); "345" represents true Air Speed (knots)
GC678<CR><LF>	"GC" (ASCII characters); "678" represents Mach Speed (thousandths)
GD<+/->9012<CR><LF>	"GD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)
GE<+/->3456<CR><LF>	"GE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)
GF<+/->78<CR><LF>	"GF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)
GG<+/->90<CR><LF>	"GG" (ASCII characters); sign; "90" represents true air temperature (Celsius)
GH123<CR><LF>	"GH" (ASCII characters); "123" represents wind direction (degrees from north)
GI456<CR><LF>	"GI" (ASCII characters); "456" represents wind speed (knots)
GJ<+/->78<CR><LF>	"GJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)
GK<+/->901<CR><LF>	"GK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)
GL234<CR><LF>	"GL" (ASCII characters); "234" represents heading (degrees from north)
GM5678<CR><LF>†	"GM" (ASCII characters); "5678" represents fuel flow, right (Twin only) (tenths gallons/hour)
GN90123<CR><LF>†	"GN" (ASCII characters); "90123" represents fuel used, right (Twin only) (tenths gallons)
GO4567<CR><LF>	"GO" (ASCII characters); "4567" represents fuel flow, left (or Single) (tenths gallons/hour)
GP89012<CR><LF>	"GP" (ASCII characters); "89012" represents fuel used, left (or Single) (tenths gallons)
GQ001<CR><LF>	"GQ" (ASCII characters); "001" represents error log/reason indicator (001 = temp. sensor error, 000 = no errors)
GR6789.0<CR><LF>†	"GR" (ASCII characters); "6789.0" represents fuel remaining (gallons)
Ga<+/->1234<CR><LF>	"Ga" (ASCII characters); sign; "12.34" represents barometric corrected altitude (tens of feet)
Gb56.78<CR><LF>	"Gb" (ASCII characters); "56.78" represents current barometric pressure setting (inches Hg)
G*901<CR><LF>	"G*" (ASCII characters); "901" represents checksum

<ETX>

Where:

<STX>	start-transmit character (0x02)
<CR>	carriage-return character (0x0d)
<LF>	line-feed character (0x0a)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
<ETX>	end-transmit character (0x03)

† Not available from Airdata Computer

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

SHADIN "S" FORMAT

<STX>

SA012<CR><LF>	"SA" (ASCII characters); "012" represents indicated Air Speed (knots)
SB345<CR><LF>	"SB" (ASCII characters); "345" represents true Air Speed (knots)
SC678<CR><LF>	"SC" (ASCII characters); "678" represents Mach Speed (thousandths)
SD<+/->9012<CR><LF>	"SD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)
SE<+/->3456<CR><LF>	"SE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)
SF<+/->78<CR><LF>	"SF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)
SG<+/->90<CR><LF>	"SG" (ASCII characters); sign; "90" represents true air temperature (Celsius)
SH123<CR><LF>	"SH" (ASCII characters); "123" represents wind direction (degrees from north)
SI456<CR><LF>	"SI" (ASCII characters); "456" represents wind speed (knots)
SJ<+/->78<CR><LF>	"SJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)
SK<+/->901<CR><LF>	"SK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)
SL234<CR><LF>	"SL" (ASCII characters); "234" represents heading (degrees from north)
SM5678<CR><LF>	"SM" (ASCII characters); "5678" represents fuel flow, right (tenths gallons/hour)
SN90123<CR><LF>	"SN" (ASCII characters); "90123" represents fuel used, right (tenths gallons)
SO4567<CR><LF>	"SO" (ASCII characters); "4567" represents fuel flow, left (tenths gallons/hour)
SP89012<CR><LF>	"SP" (ASCII characters); "89012" represents fuel used, left (tenths gallons)
SQ345<CR><LF>	"SQ" (ASCII characters); "345" represents error log/reason indicator
SR67890<CR><LF>	"SR" (ASCII characters); "67890" represents fuel remaining (tenths gallons)
SS123<CR><LF>	"SS" (ASCII character); "123" represents ground speed (knots)
ST456<CR>LF>	"ST" (ASCII character); "456" represents track (degrees)
SU789012<CR><LF>	"SU" (ASCII character); "789012" represents distance to waypoint (hundredths nautical miles)
SV<E/W>345<CR><LF>	"SV" (ASCII character); "E" represents East, "W" represents West; "345" represents magnetic variation (tenths degrees)

SW<N/S>67 8901<CR><LF>"SW" (ASCII character); "N" represents North, "S" represents South; "67 8910" represents current latitude (degrees, minutes, hundredths of minutes)

SX<E/W>234 5678<CR><LF>"SX" (ASCII character); "E" represents East, "W" represents West; "234 5678" represents current longitude (degrees, minutes, hundredths of minutes)

SY<L/R>90<CR><LF>	"SY" (ASCII character); "L" represents Left, "R" represents Right; "90" represents drift angle (degrees)
Sa<+/->1234<CR><LF>	"Sa" (ASCII character); sign; "1234" represents barometric corrected altitude (tens of feet)
Sb56.78<CR><LF>	"Sb" (ASCII character); "56.78" represents current barometric pressure setting (inches Hg)
S*901<CR><LF>	"S*" (ASCII character); "901" represents checksum

<ETX>

Where:

<STX>	start-transmit character (0x02)
<CR>	carriage-return character (0x0d)
<LF>	line-feed character (0x0a)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
<ETX>	end-transmit character (0x03)

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

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Appendix C MECHANICAL DRAWINGS

C.1 Drawing List

The following drawings are included in this section.

- ❒ Figure C-1. GTN 7XX Dimensions and Center of Gravity
- ❒ Figure C-2. GTN 7XX Mounting Rack Installation
- ❒ Figure C-3. GTN 7XX Panel Cutout Detail
- ❒ Figure C-4. GTN 7XX Mounting Rack Tab Alignment Detail
- ❒ Figure C-5. GTN 7XX Connector Layout Detail

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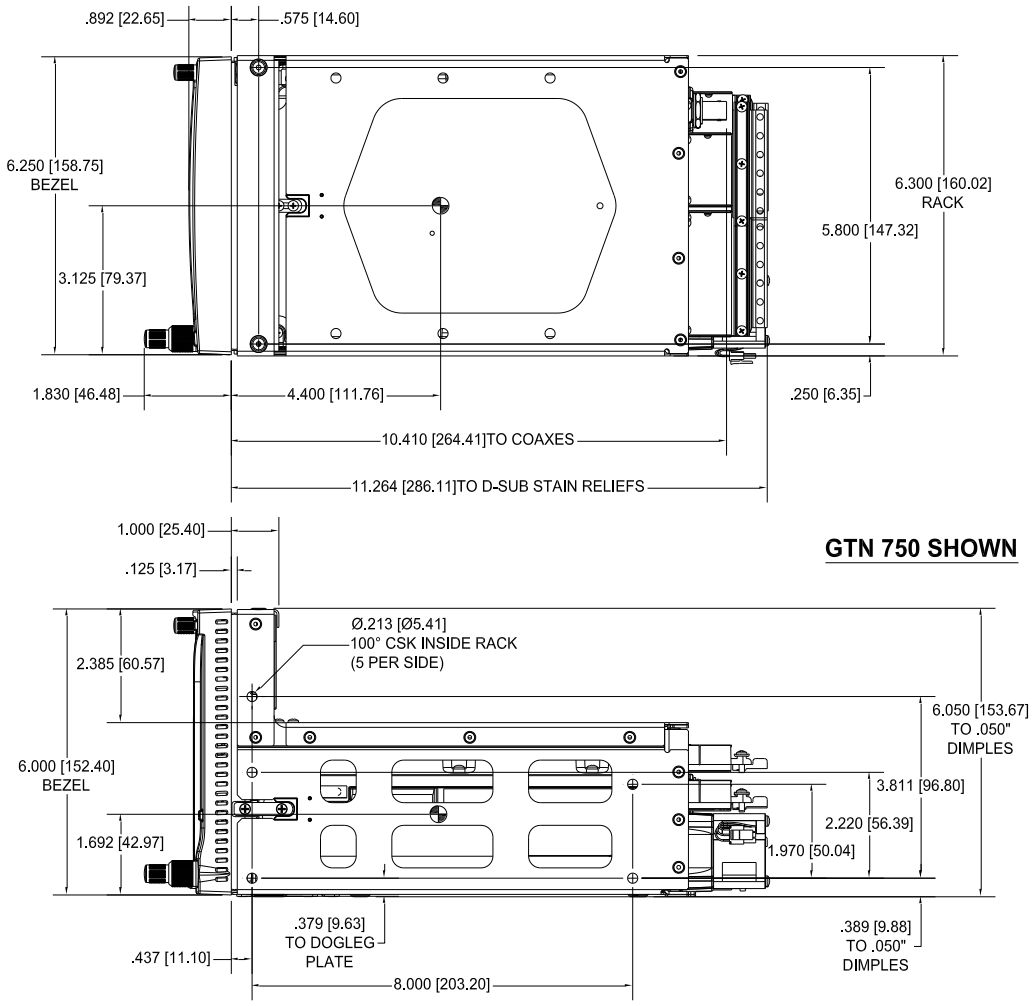
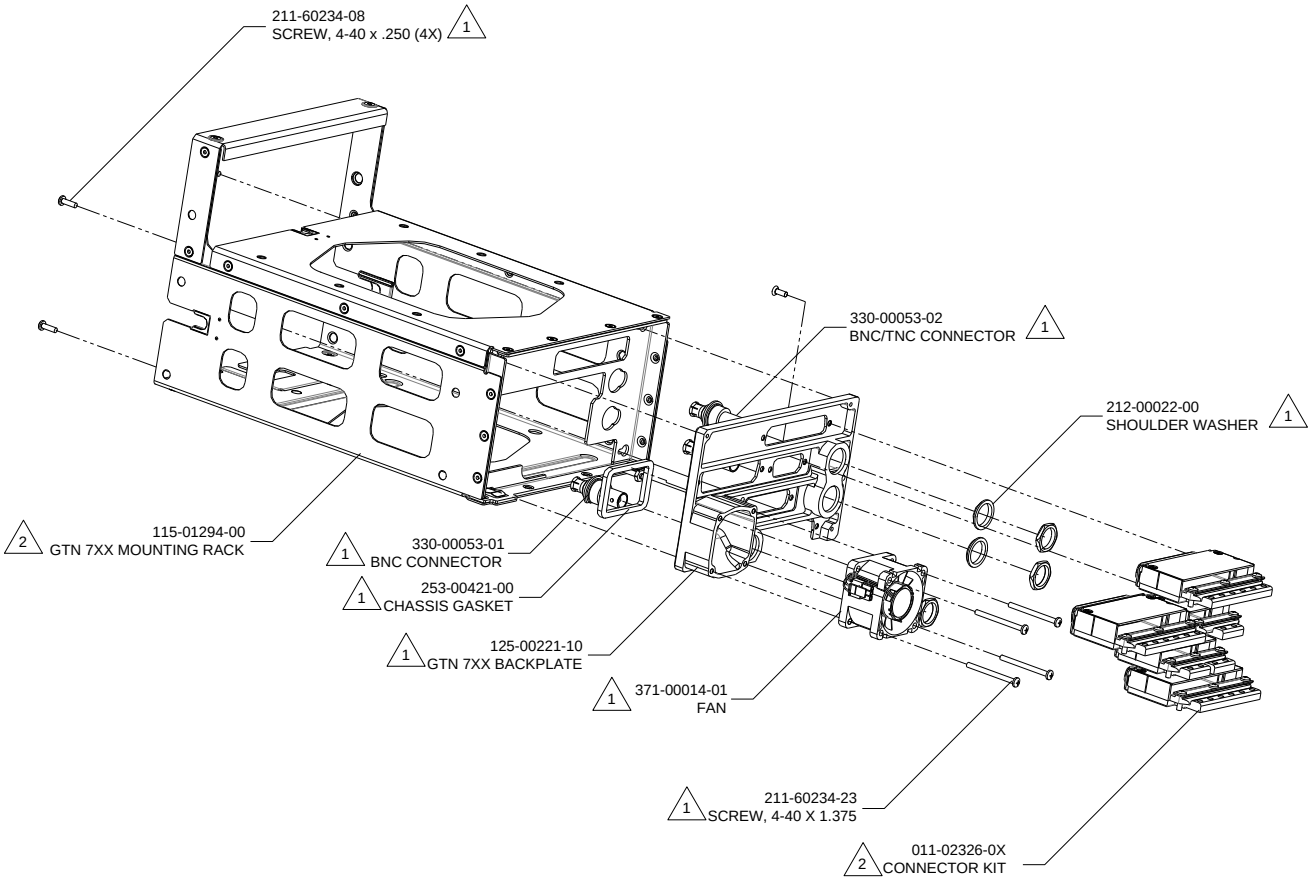


	DIMENSIONS			WEIGHT	
MODEL	A	B	C	UNIT	UNIT & CONN KIT
GTN 725	3.16 [80.3]	4.05 [102.9]	2.20 [55.9]	6.1 lb [2.80 kg]	7.7 lb [3.52 kg]
GTN 750	3.17 [80.5]	4.40 [111.8]	1.86 [47.2]	7.4 lb [3.38 kg]	9.3 lb [4.24 kg]

NOTES:

1. DIMENSIONS: INCH [mm].
2. CG LOCATION INCLUDES UNIT WITH MOUNTING RACK AND BACK PLATE ASSEMBLY.

Figure C-1. GTN 7XX Dimensions and Center of Gravity



1 PART OF 011-02246-00 (GTN 725, BLACK) AND 011-02246-02 (GTN 750, BLACK AND GRAY) KITS. SEE TABLE FOR KIT CONTENT DIFFERENCES.

2 REFERENCE 011-00819-50 (GTN 725, BLACK), 011-00820-50 (GTN 750, BLACK), AND 011-00890-50 (GTN 750, GRAY) KITS

3 SEE TABLE FOR KIT REFERENCE INFORMATION

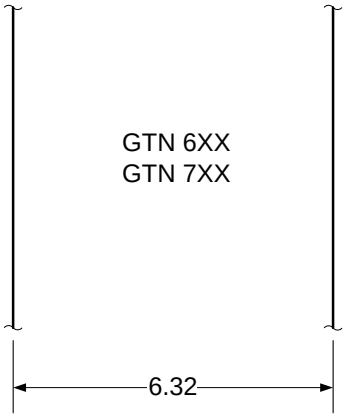
4 TORQUE 4.5 – 5.2 IN-LBS

UNIT DESCRIPTION	INSTALLATION KIT	CONNECTOR KIT 2	BACKPLATE KIT 2	BACKPLATE KIT CONTENT DIFFERENCES	QTY (EACH)
GTN 725	011-00819-50	011-02326-00	011-02246-00	212-00022-00 (WASHER) 330-00053-02 (BNC CONNECTOR)	0
GTN 750 (BLACK)	011-00820-50	011-02326-02	011-02246-02		2
GTN 750 (GRAY)	011-00890-50	011-02326-02	011-02246-02		2

Figure C-2. GTN 7XX Mounting Rack Installation

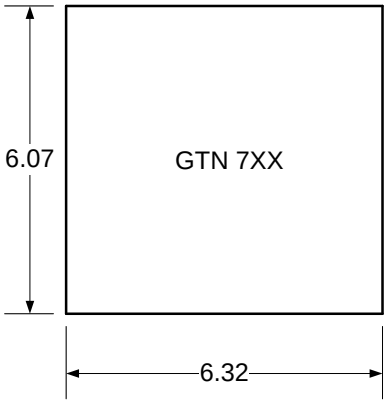
OPTION 1:

STACK CUTOUT
(RACK INSTALLED
FROM FRONT OF
AIRCRAFT PANEL)



OPTION 2:

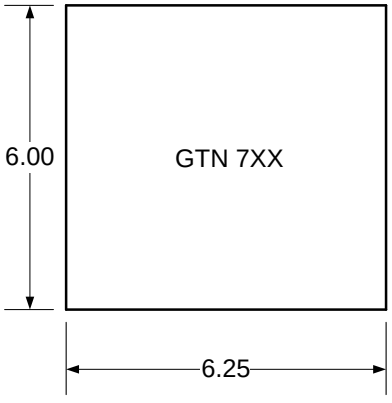
RADIO CUTOUT
(RACK INSTALLED
FROM FRONT OF
AIRCRAFT PANEL)



OPTION 3:

RADIO CUTOUT
(RACK INSTALLED
FROM BACK OF
AIRCRAFT PANEL
ONLY)

MAXIMUM AIRCRAFT
PANEL THICKNESS
IS .125 INCH.



NOTES, ALL OPTIONS:
1. DIMENSIONS ARE IN INCHES
2. IF THE FRONT LIP OF THE MOUNTING RACK IS BEHIND THE SURFACE OF THE AIRCRAFT INSTRUMENT PANEL, THE UNIT CONNECTORS MAY NOT FULLY ENGAGE.
3. TOLERANCE: ±0.03 INCHES.

Figure C-3. GTN 7XX Panel Cutout Detail

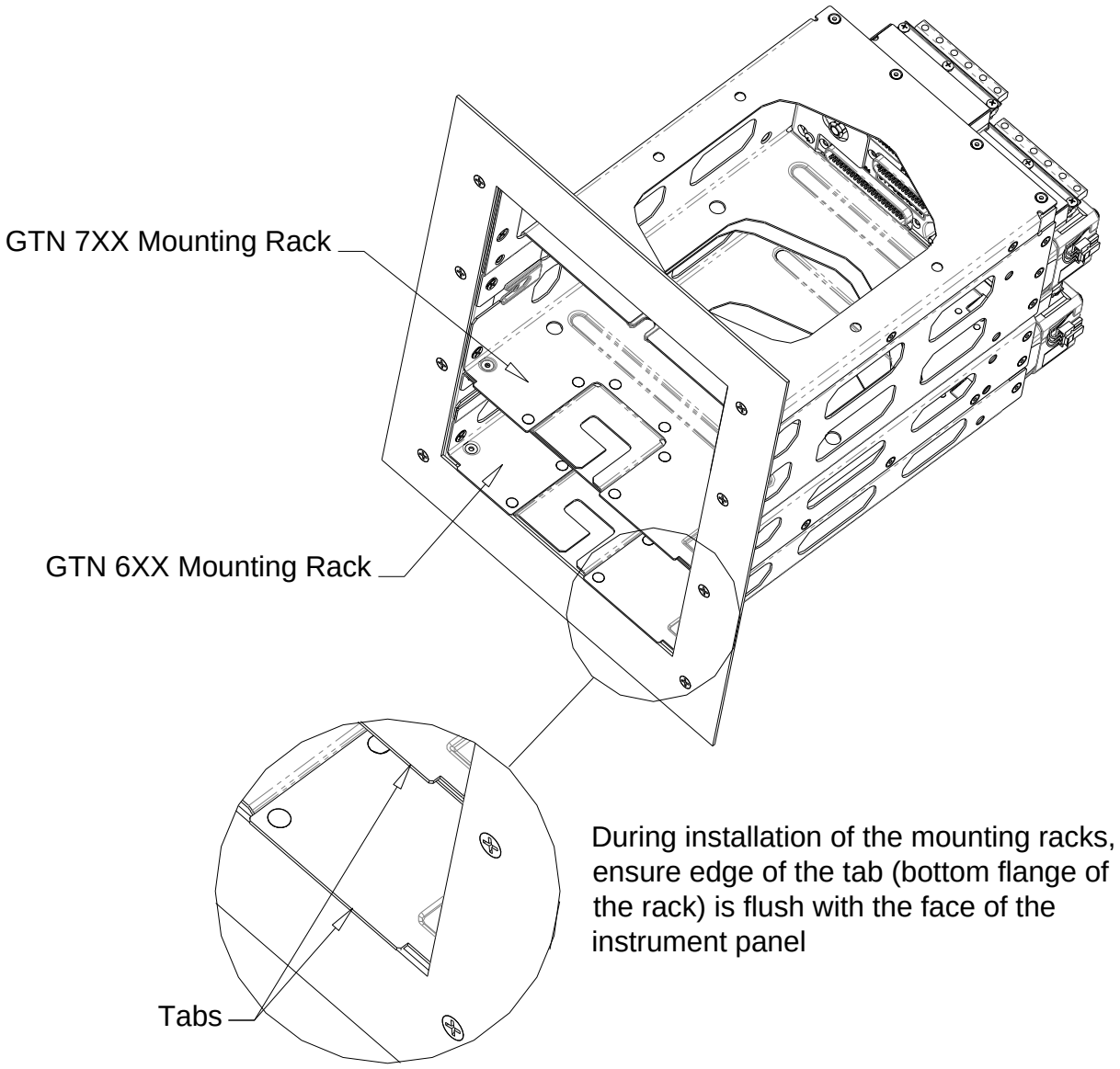
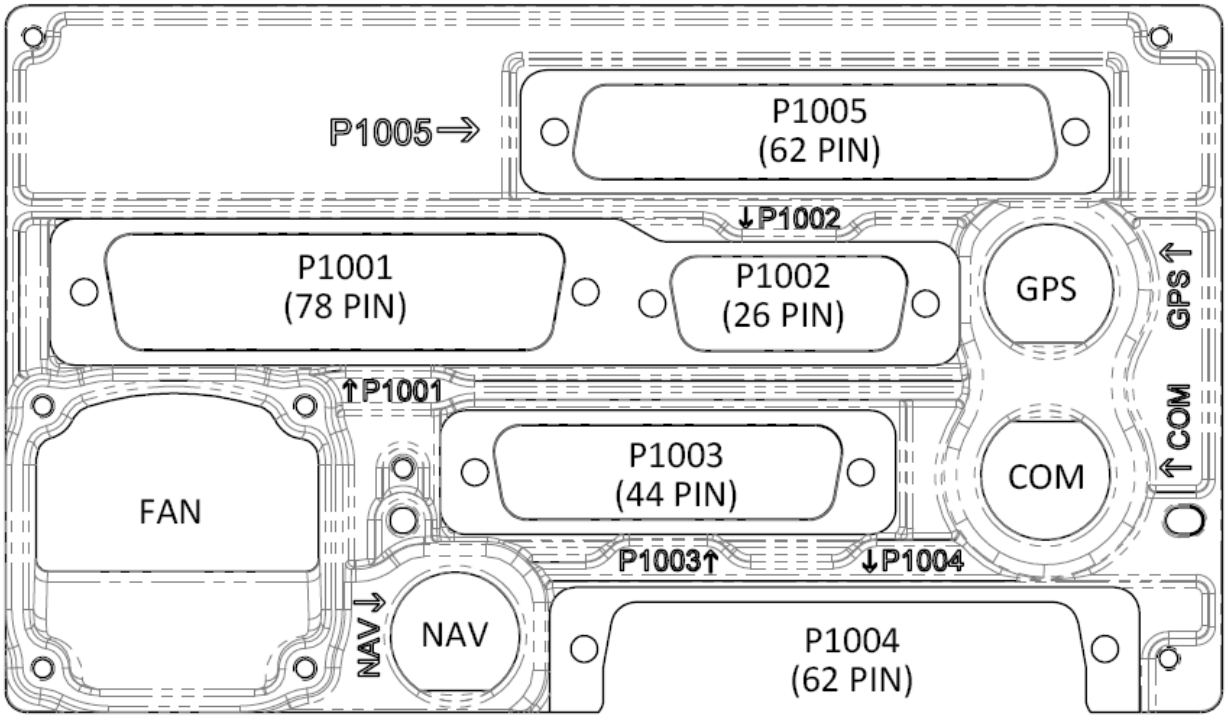

GTN 7XX Mounting Rack
GTN 6XX Mounting Rack
During installation of the mounting racks, ensure edge of the tab (bottom flange of the rack) is flush with the face of the instrument panel
Tabs

Figure C-4. GTN 7XX Mounting Rack Tab Alignment Detail



GTN7XX - REAR VIEW OF CONNECTOR PLATE

Figure C-5. GTN 7XX Connector Layout Detail

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Appendix D INTERCONNECT DIAGRAMS

D.1 Drawing List

The following drawings are included in this section:

- ❒ Figure D-1. GTN System Interface Diagram
- ❒ Figure D-2. GTN 750 Typical Installation
- ❒ Figure D-3. GTN 725 Typical Installation
- ❒ Figure D-4. GTN Power Lighting Configuration Interconnect
- ❒ Figure D-5. GTN – Antenna Interconnect
- ❒ Figure D-6. GTN - Main Indicator Interconnect
- ❒ Figure D-7. GTN - Autopilot Interconnect
- ❒ Figure D-8. GTN - Traffic Interconnect
- ❒ Figure D-9. GTN - Transponder Interconnect
- ❒ Figure D-10. Dual GTN to Single GDU Interconnect
- ❒ Figure D-11. GTN - GDU/AHRS Interconnect
- ❒ Figure D-12. GTN - ARINC 429 EFIS Interconnect
- ❒ Figure D-13. GTN - GDL 69/69A Interconnect
- ❒ Figure D-14. Audio Panel Interconnect
- ❒ Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
- ❒ Figure D-16. Air Data/IRU/AHRS ARINC 429 Interconnect
- ❒ Figure D-17. GAD 42 Interconnect
- ❒ Figure D-18. VOR/ILS Indicator Interconnect
- ❒ Figure D-19. RMI OBI Interconnect
- ❒ Figure D-20. GTN – WX-500 Interconnect
- ❒ Figure D-21. GTN 750 - DME Interconnect
- ❒ Figure D-22. GTN 750 – Remote DME Interconnect
- ❒ Figure D-23. Parallel 2 of 5 DME Tuning
- ❒ Figure D-24. Parallel Slip Code DME Tuning Interconnect
- ❒ Figure D-25. Heading Synchro Interconnect
- ❒ Figure D-26. GPS Annunciator Interconnect
- ❒ Figure D-27. NAV Source Select Annunciator Interconnect
- ❒ Figure D-28. TAWS Interconnect
- ❒ Figure D-29. Switches Interconnect

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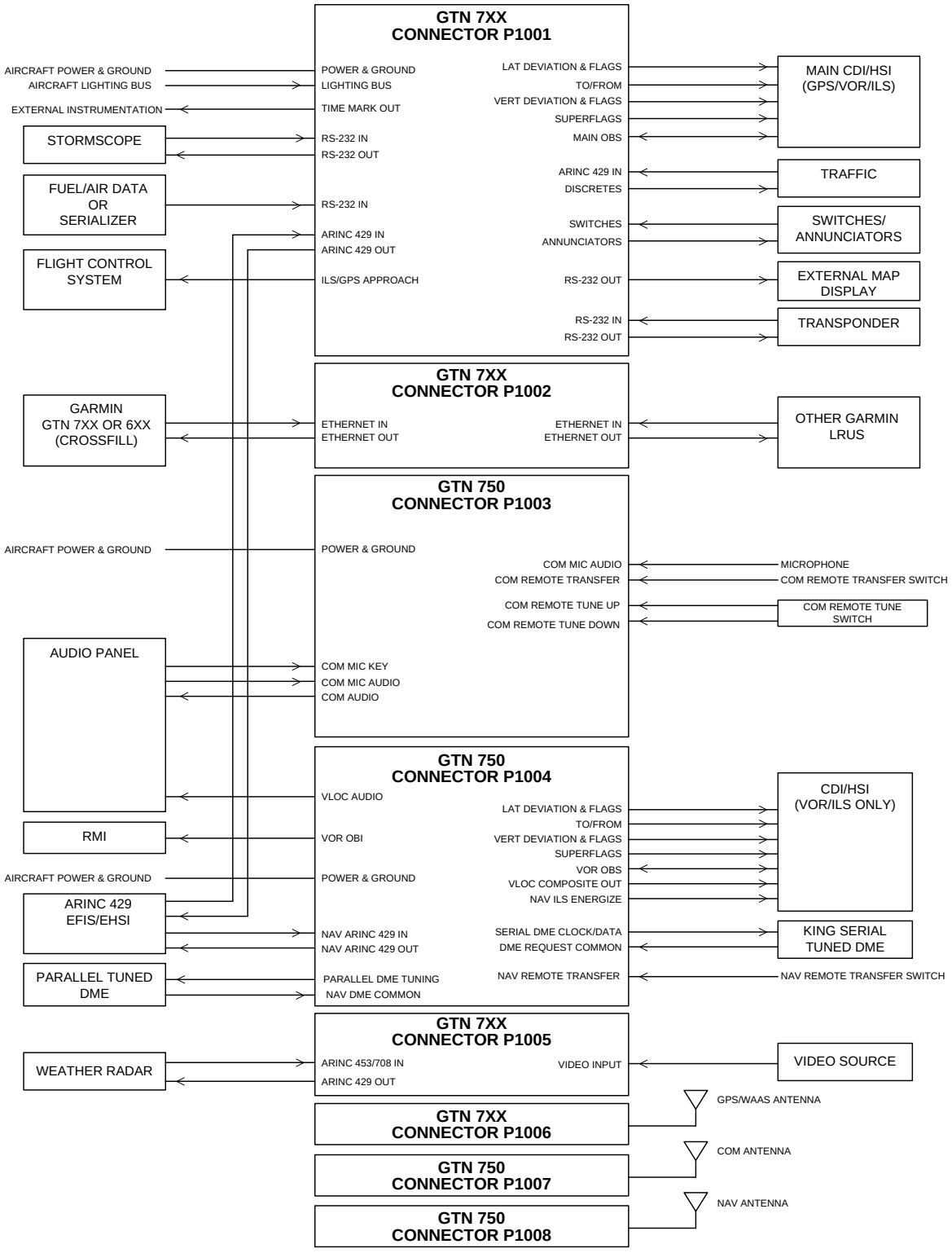


Figure D-1. GTN System Interface Diagram

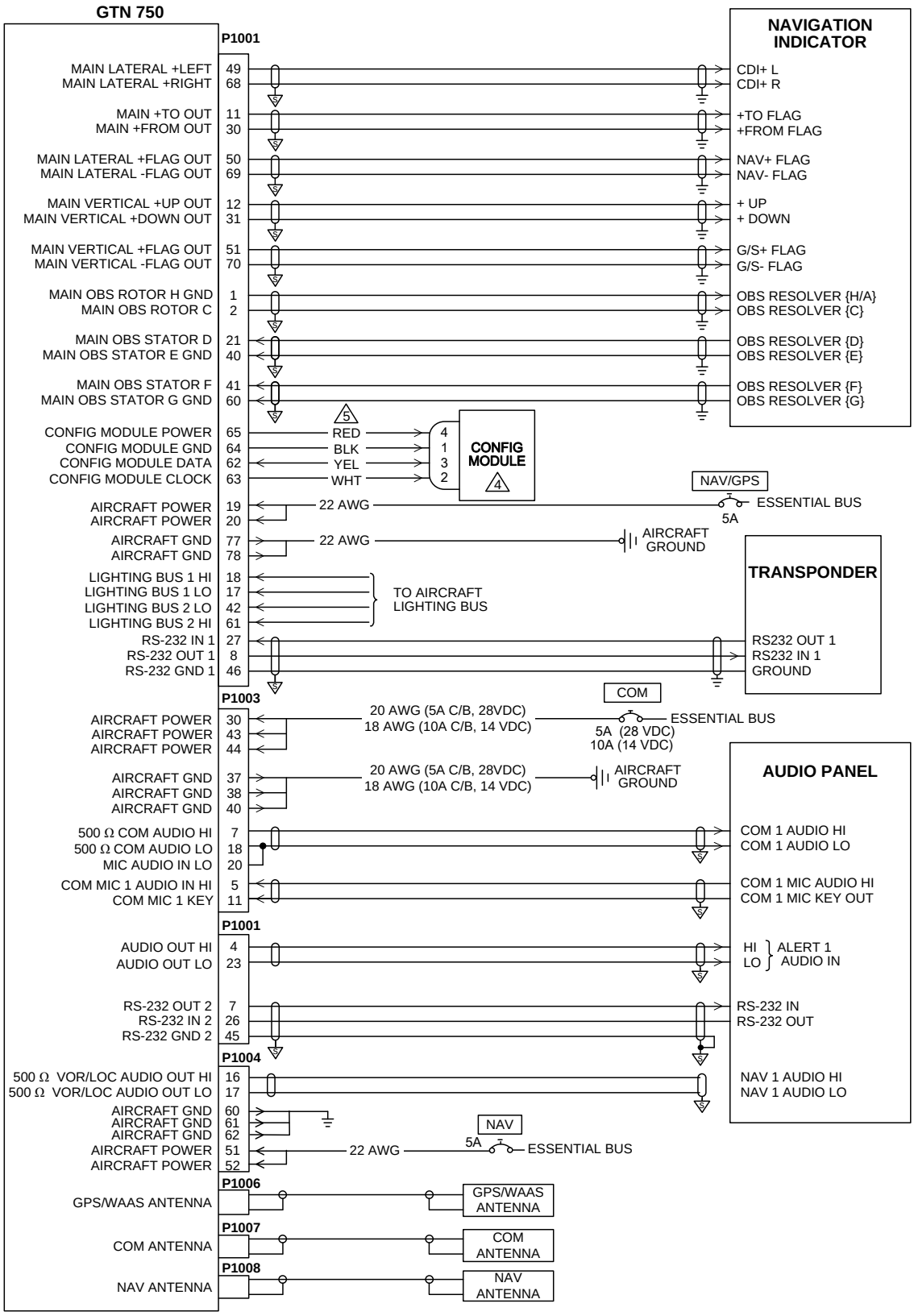


Figure D-2. GTN 750 Typical Installation
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 7XX INSTALLATION. REFER TO APPROPRIATE INTERCONNECT DIAGRAMS FOR SPECIFIC EQUIPMENT.
5. CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH THE CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.
6. AIRCRAFT POWER MUST BE 11-33 VDC.

Figure D-2. GTN 750 Typical Installation
Sheet 2 of 2

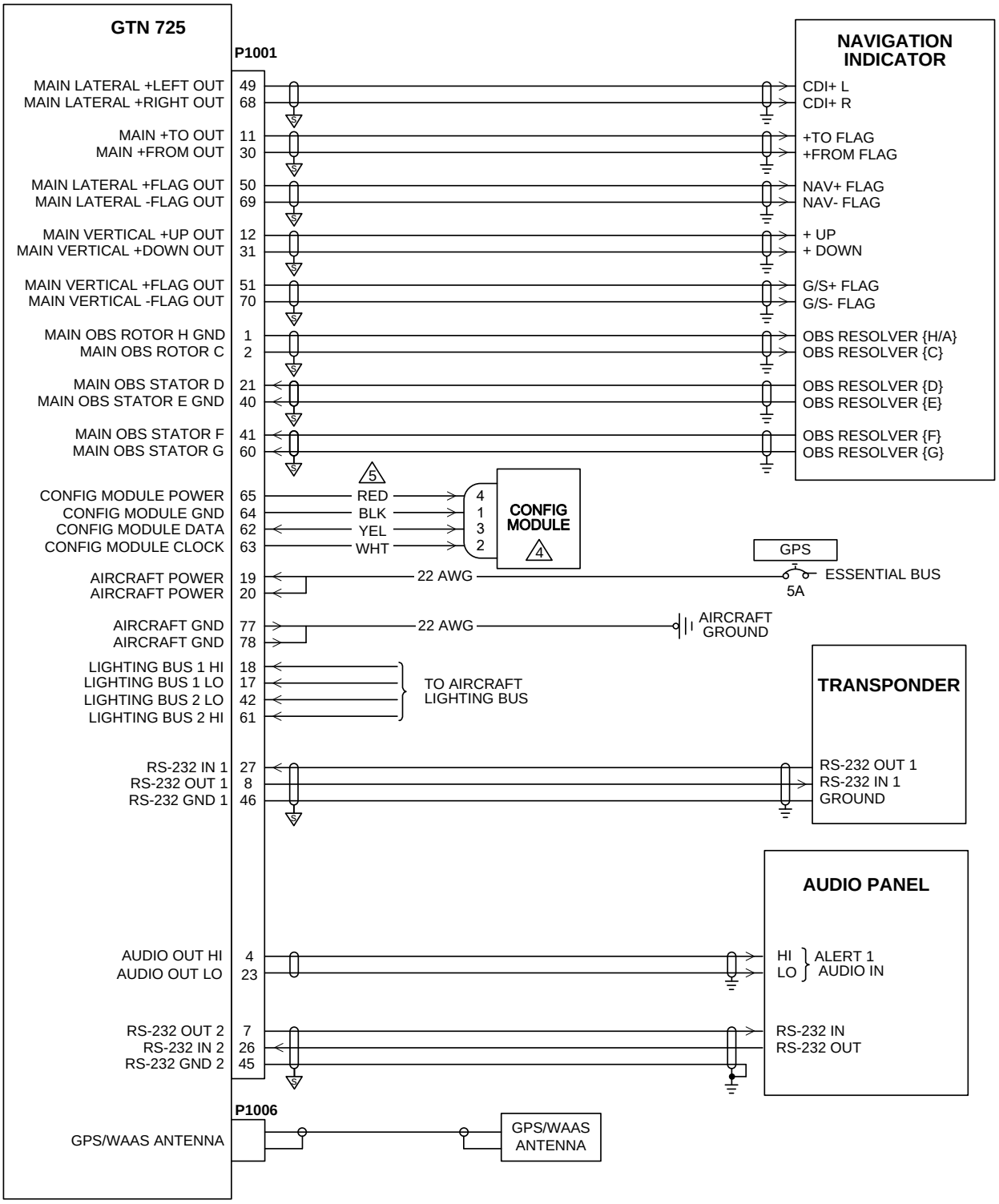
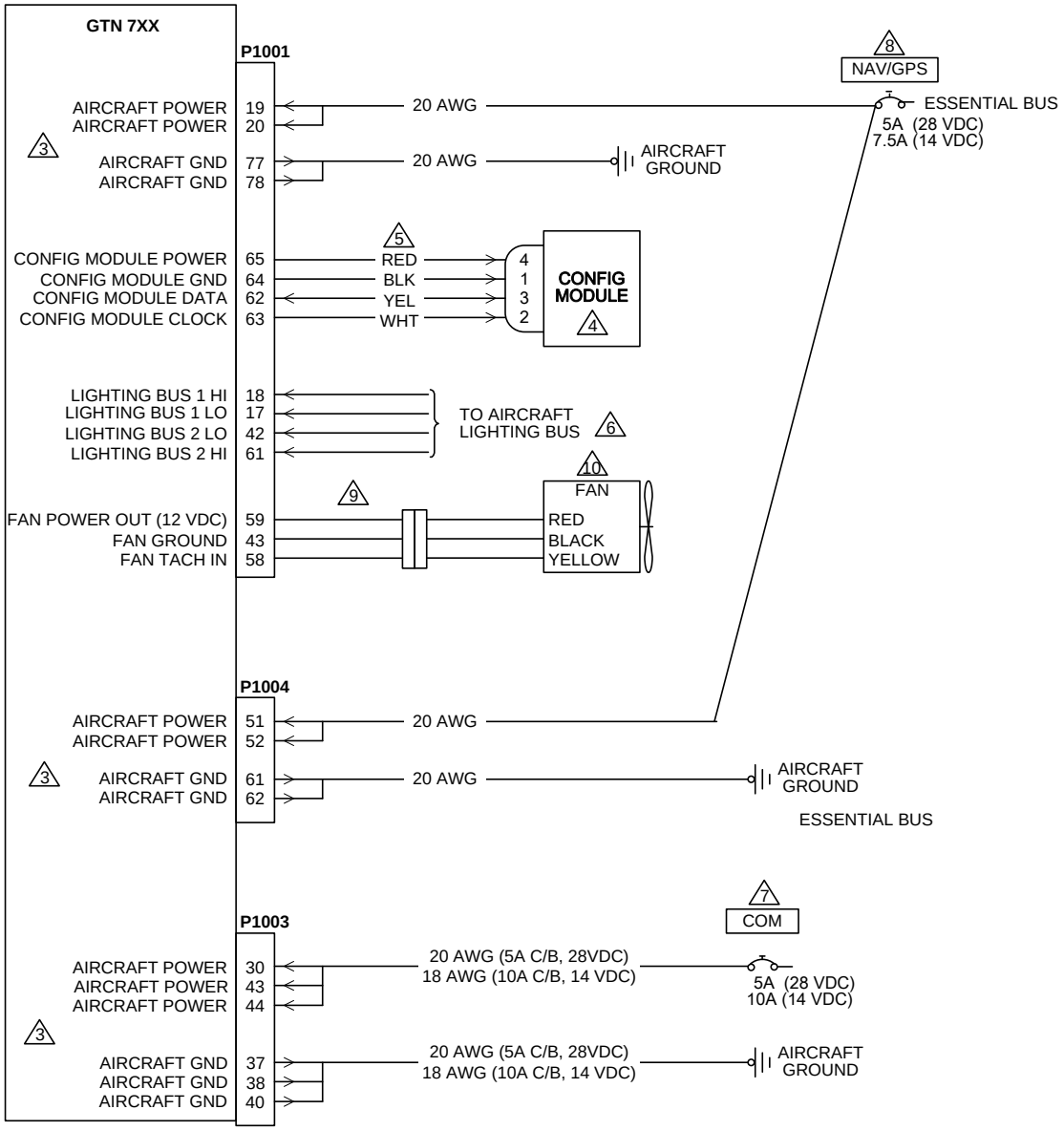


Figure D-3. GTN 725 Typical Installation
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 7XX INSTALLATION. REFER TO APPROPRIATE INTERCONNECT DIAGRAMS FOR SPECIFIC EQUIPMENT.
5. CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH THE CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.
6. AIRCRAFT POWER MUST BE 11-33 VDC.

Figure D-3. GTN 725 Typical Installation
Sheet 2 of 2

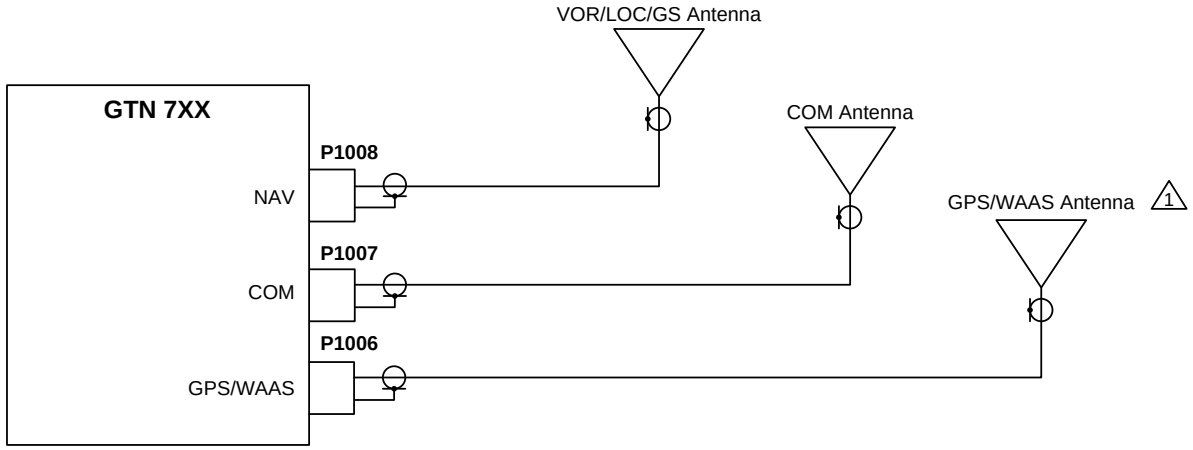


NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. ALL POWER LEADS AND GROUND LEADS ARE REQUIRED.
4. CONFIGURATION MODULE IS MOUNTED IN THE BACKSHELL OF THE P1001 CONNECTOR.
5. CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.
6. OPTIONAL CONNECTION. LIGHTING CAN BE CONTROLLED BY THE INTEGRATED PHOTOCELL, A SINGLE LIGHTING BUS, OR DUAL LIGHTING BUSES.
7. CIRCUIT BREAKER SHOULD BE LABELED AS SHOWN.
8. CIRCUIT BREAKER SHOULD BE LABELED AS: “GPS” FOR THE GTN 725, AND “NAV/GPS” FOR THE GTN 750
9. IF MODIFICATION OF THE HARNESS FROM THE FAN TO THE P1001 CONNECTOR IS NECESSARY, THE MODIFIED LENGTH MUST NOT BE LONGER THAN 8 INCHES. THE FAN HARNESS PART NUMBER IS 320-00600-00 AND IS SUPPLIED AS PART OF THE GTN 7XX CONNECTOR KIT.
10. FAN SUPPLIED AS PART OF THE BACKPLATE ASSEMBLY.

Figure D-4. GTN Power Lighting Configuration Interconnect
Sheet 1 of 1

SINGLE GTN INSTALLATION



DUAL GTN INSTALLATION

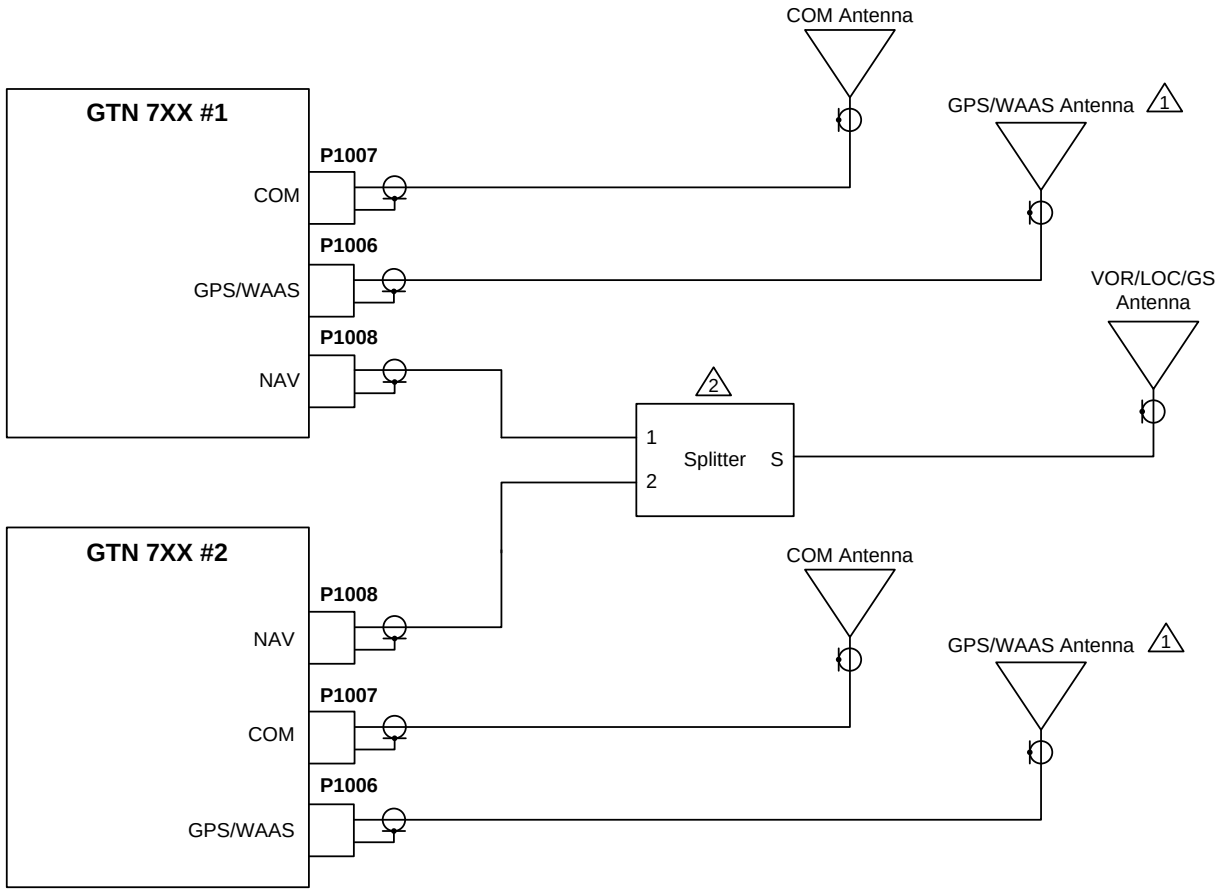
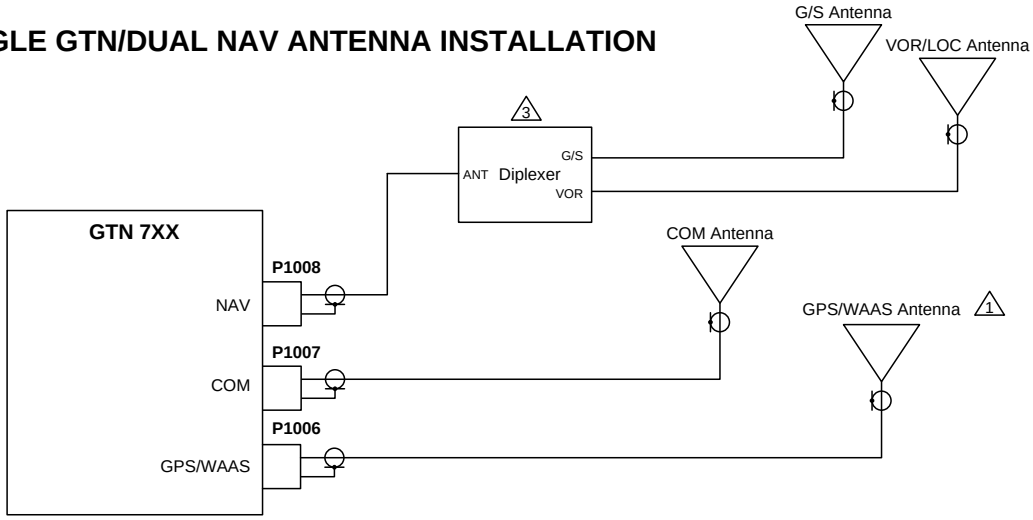


Figure D-5. GTN – Antenna Interconnect
Sheet 1 of 3

SINGLE GTN/DUAL NAV ANTENNA INSTALLATION



DUAL GTN/DUAL NAV ANTENNA INSTALLATION

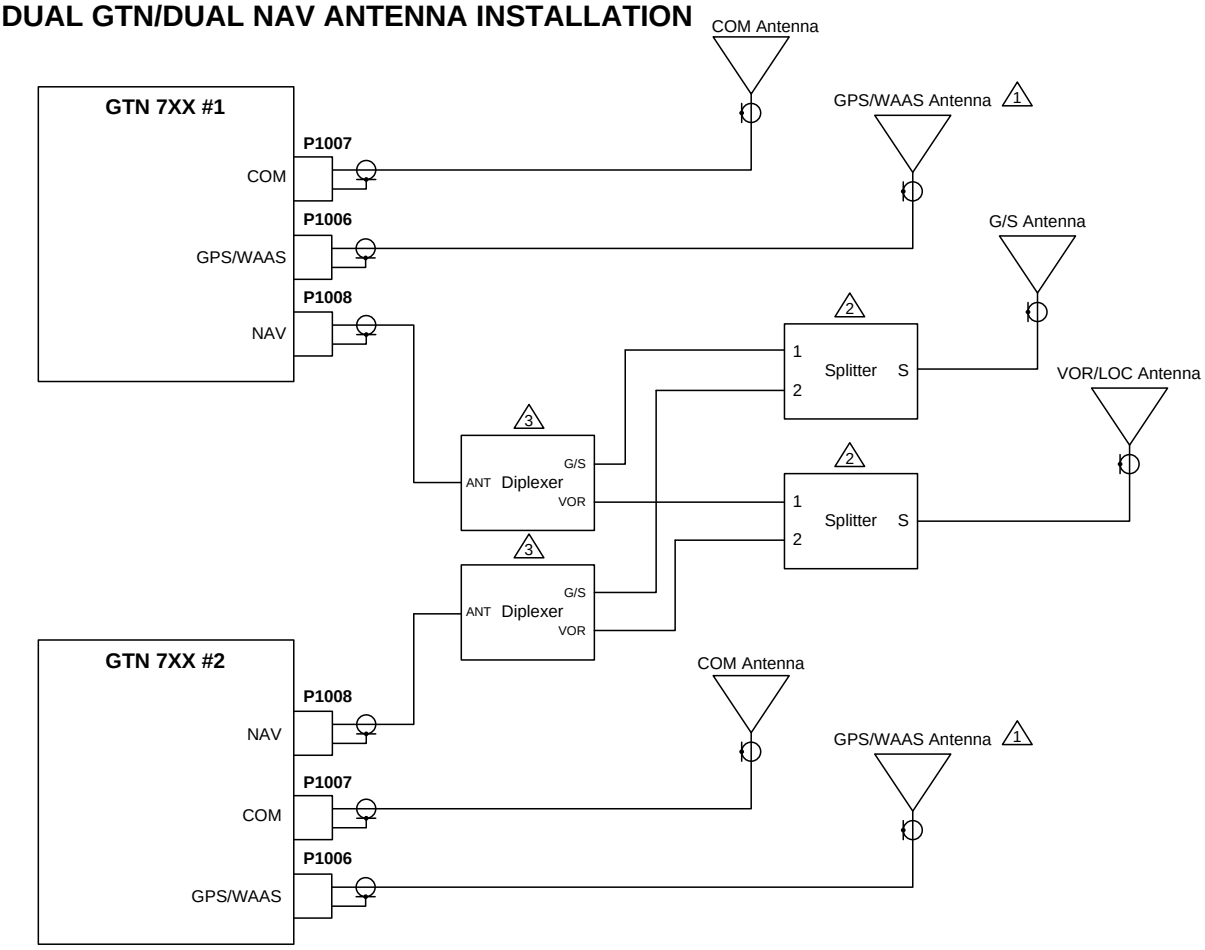
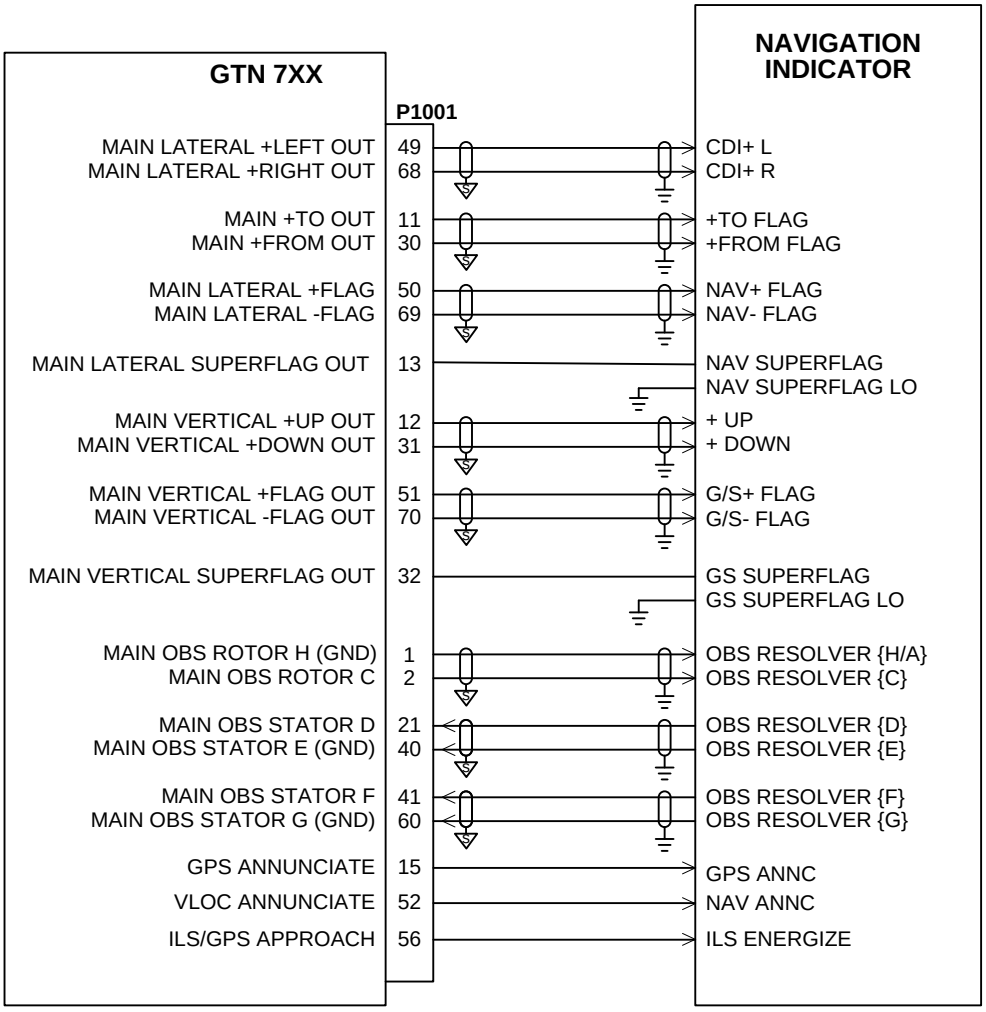


Figure D-5. GTN – Antenna Interconnect
Sheet 2 of 3

1. THE GPS ANTENNA COAXIAL CABLE MUST BE DOUBLE OR TRIPLE SHIELDED AND THE LOSS (INCLUDING CONNECTORS) MUST BE GREATER THAN 1.5 dB AND LESS THAN 6 dB. REFER TO SECTION 4.11.1 FOR ADDITIONAL INFORMATION.
2. MINI-CIRCUITS SPLITTER P/N ZFSC-2-1B+ (OR EQUIVALENT) SHOULD BE USED.
3. COMANT DIPLEXER P/N CI 507 (OR EQUIVALENT) SHOULD BE USED.

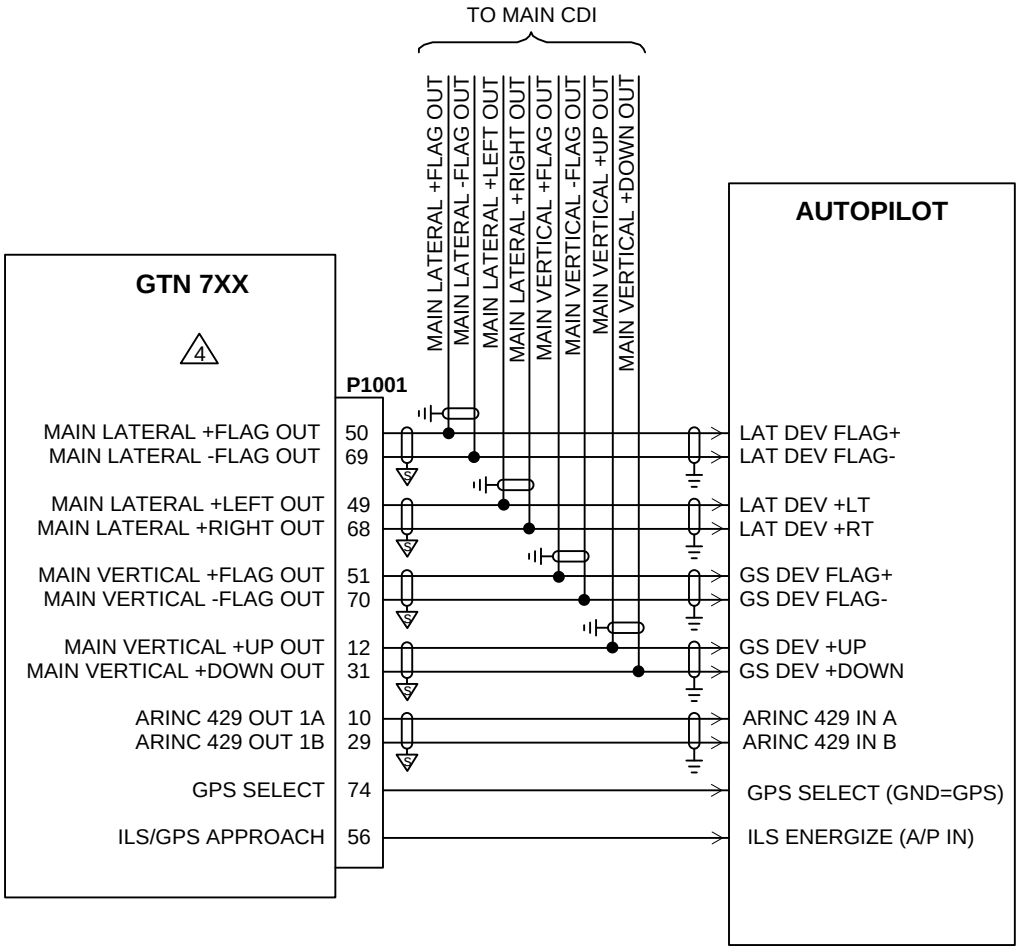
Figure D-5. GTN – Antenna Interconnect
Sheet 3 of 3



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.

Figure D-6. GTN - Main Indicator Interconnect



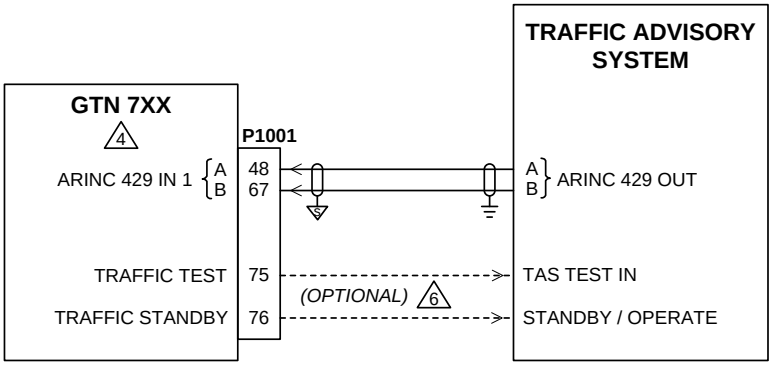
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.

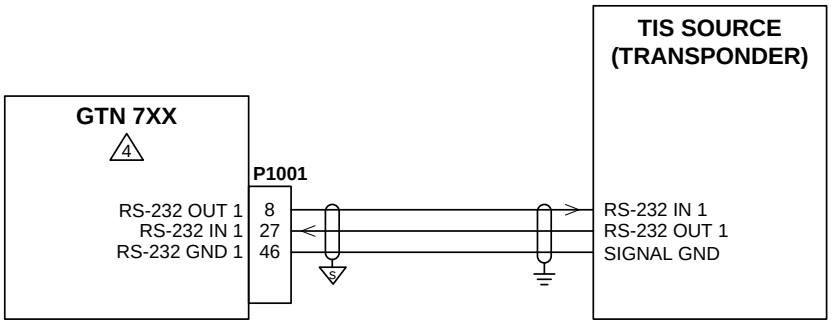
4. SEE SECTION 6.6.1 FOR GTN CONFIGURATION SETUP INSTRUCTIONS.

Figure D-7. GTN - Autopilot Interconnect

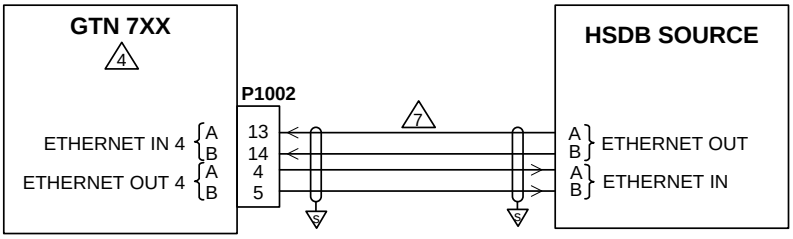
TYPICAL CONNECTIONS TO ARINC 429 TRAFFIC SOURCE



TYPICAL CONNECTIONS TO TIS SOURCE



TYPICAL CONNECTIONS TO HSDB SOURCE



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. ONLY ONE TRAFFIC SOURCE MAY BE CONNECTED TO THE GTN 7XX.

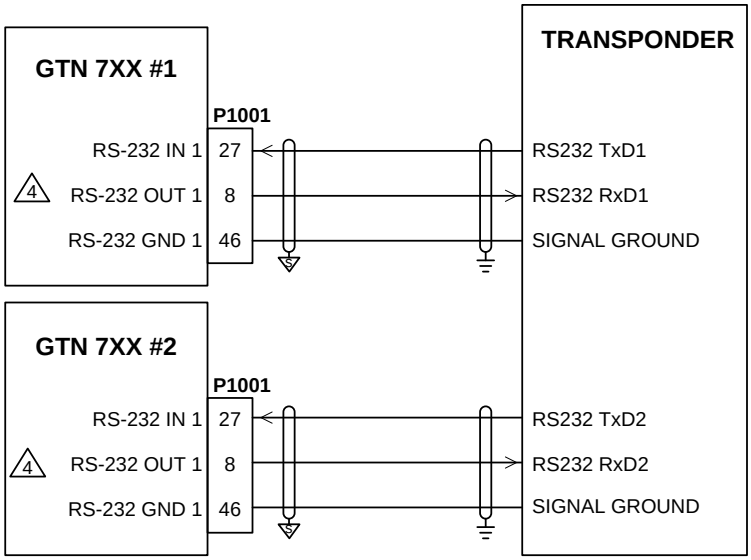
5. REFER TO SECTION 6 FOR GTN 7XX CONFIGURATION SETUP.

6. THESE OPTIONAL DISCRETE CONNECTIONS ARE NOT REQUIRED IF THE GTN 7XX IS CONFIGURED FOR '+ EXTERNAL CONTROL'. IN THIS CASE, THE GTN 7XX WILL NOT CONTROL THE TRAFFIC ADVISORY SYSTEM OPERATION. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

7. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	392404 (24 AWG)

Figure D-8. GTN - Traffic Interconnect



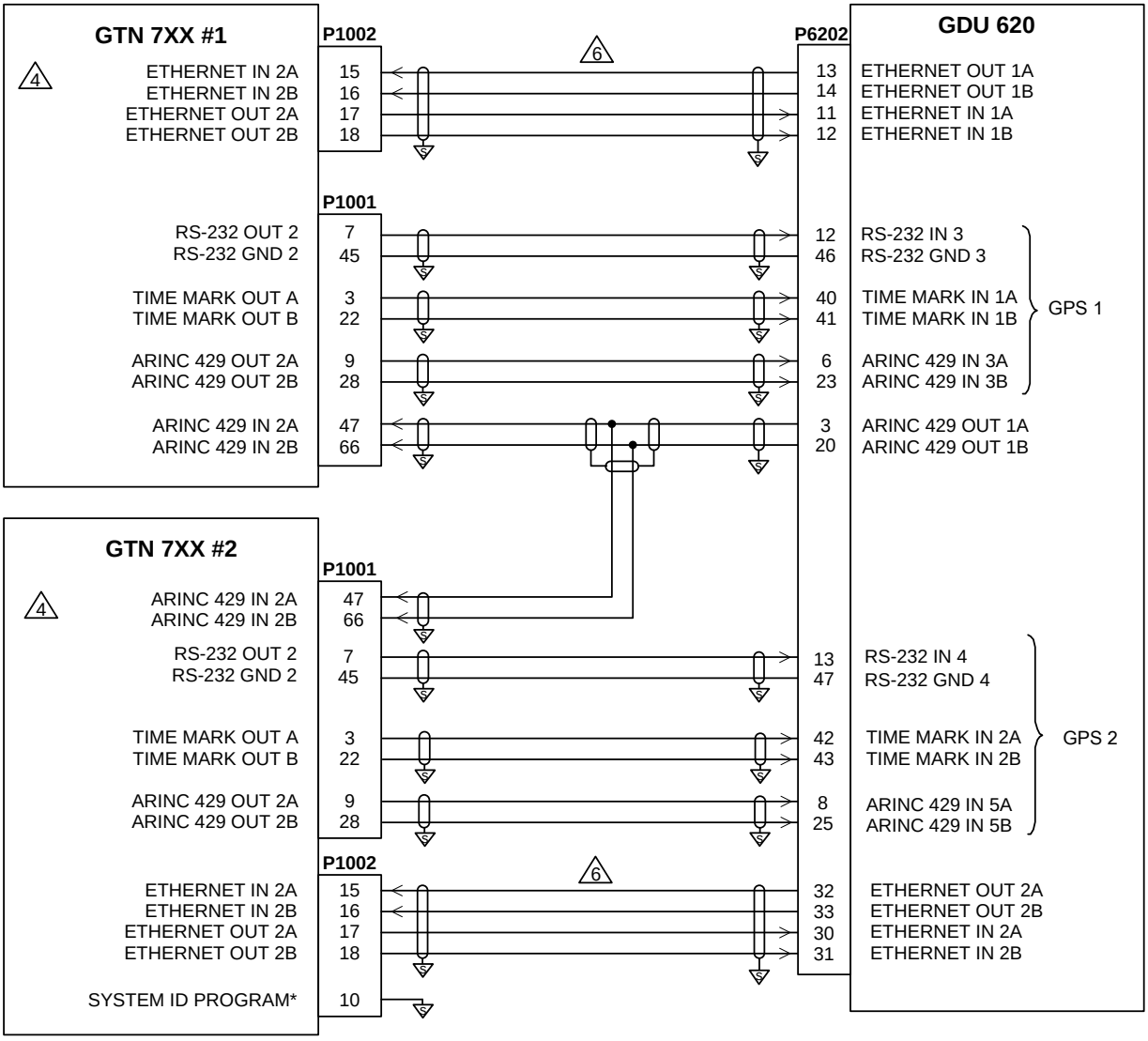
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. IF RS-232 PORT 1 IS ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF PORT 1. REFER TO SECTION 6.4.2 FOR RS-232 SETTINGS.

5. WHEN TIS IS USED IN THE AIRCRAFT DO NOT CONNECT ANOTHER TRAFFIC SYSTEM TO THE SAME GTN 7XX UNIT.
6. REFER TO SECTION 6 FOR RS-232 CONFIGURATION SETTINGS.

Figure D-9. GTN - Transponder Interconnect

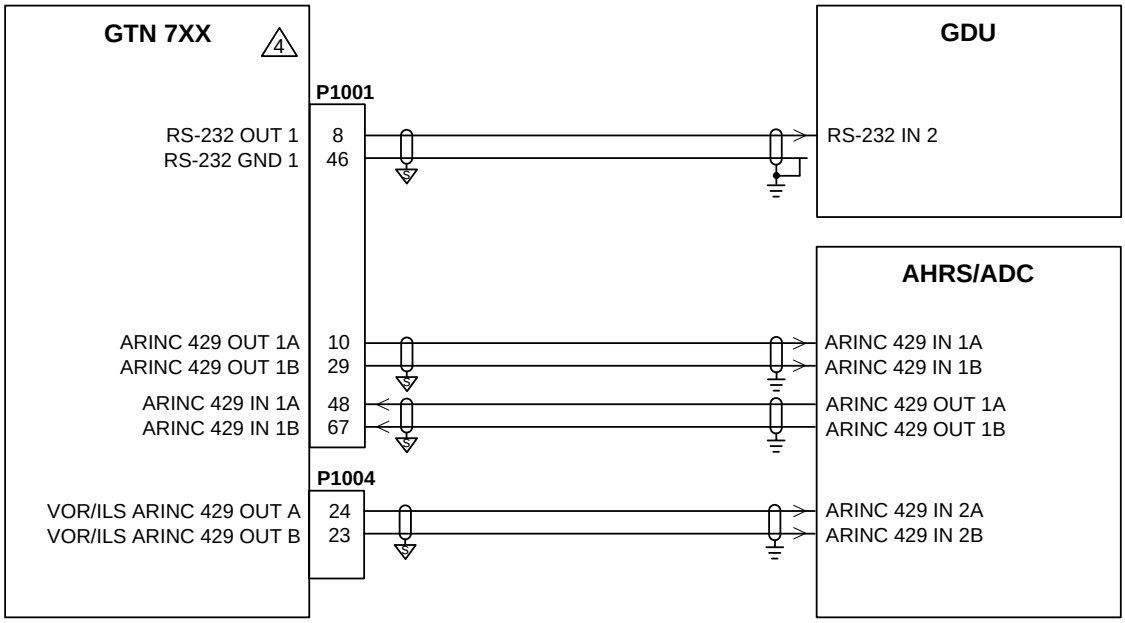


NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ".
3. IF ONLY ONE GTN 7XX IS INSTALLED, CONNECT AS SHOWN FOR GTN #1.
4. IF A TAWS-EQUIPPED GTN 7XX UNIT IS INSTALLED, IT **MUST** BE CONNECTED AS GTN #1 – ONLY TAWS ANNUNCIATIONS FROM GTN #1 ARE DISPLAYED ON THE PFD. IF TWO TAWS-EQUIPPED UNITS ARE INSTALLED, THE TAWS-EQUIPPED UNIT THAT IS CONNECTED TO THE AUDIO PANEL **MUST** BE CONNECTED AS GTN #1.
5. REFER TO MANUFACTURER INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
6. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	392404 (24 AWG)

Figure D-10. Dual GTN to Single GDU Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. FOR GTN 7XX CONFIGURATION SETTINGS, SEE SECTION 6.

Figure D-11. GTN - GDU/AHRS Interconnect

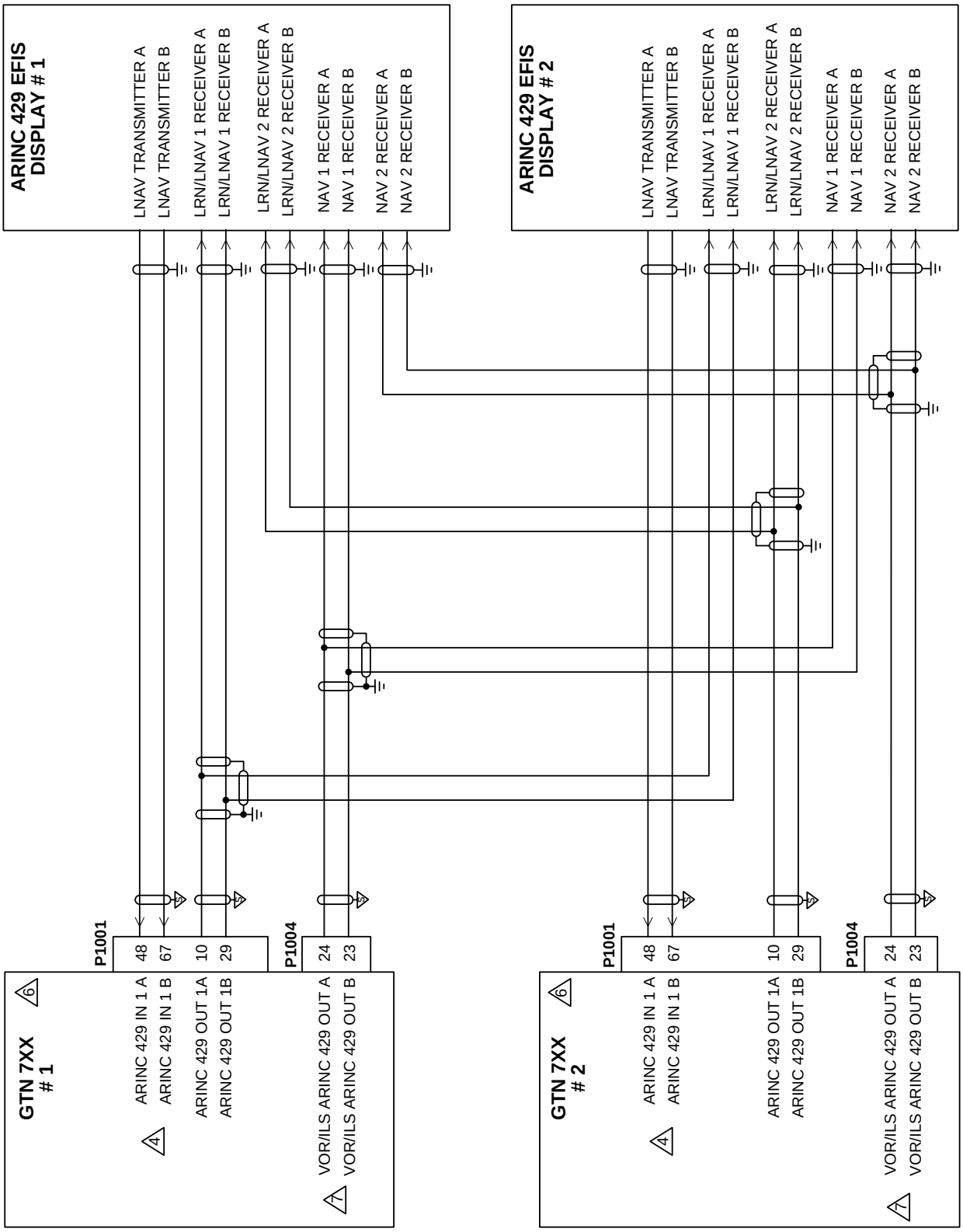
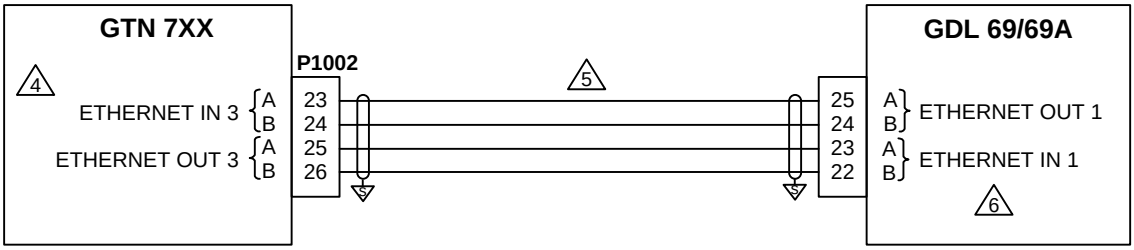


Figure D-12. GTN - ARINC 429 EFIS Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. IF THE ARINC 429 IN 1 PORT (P1001 PINS -48 AND -67) IS ALREADY USED FOR ANOTHER PURPOSE, THE ARINC 429 IN 2 PORT (P1001 PINS -47 AND -66) MAY BE CONNECTED INSTEAD.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
6. REFER TO SECTION 6 FOR GTN 7XX CONFIGURATION SETTINGS.
7. THESE OUTPUTS ARE USED ON THE GTN 750 ONLY.

Figure D-12. GTN - ARINC 429 EFIS Interconnect
Sheet 2 of 2



1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ". CONNECT THE SHIELD GROUNDS AT THE GDL 69/69A TO ITS CONNECTOR BACKSHELL IN ACCORDANCE WITH THE GDL 69/69A INSTALLATION INSTRUCTIONS.

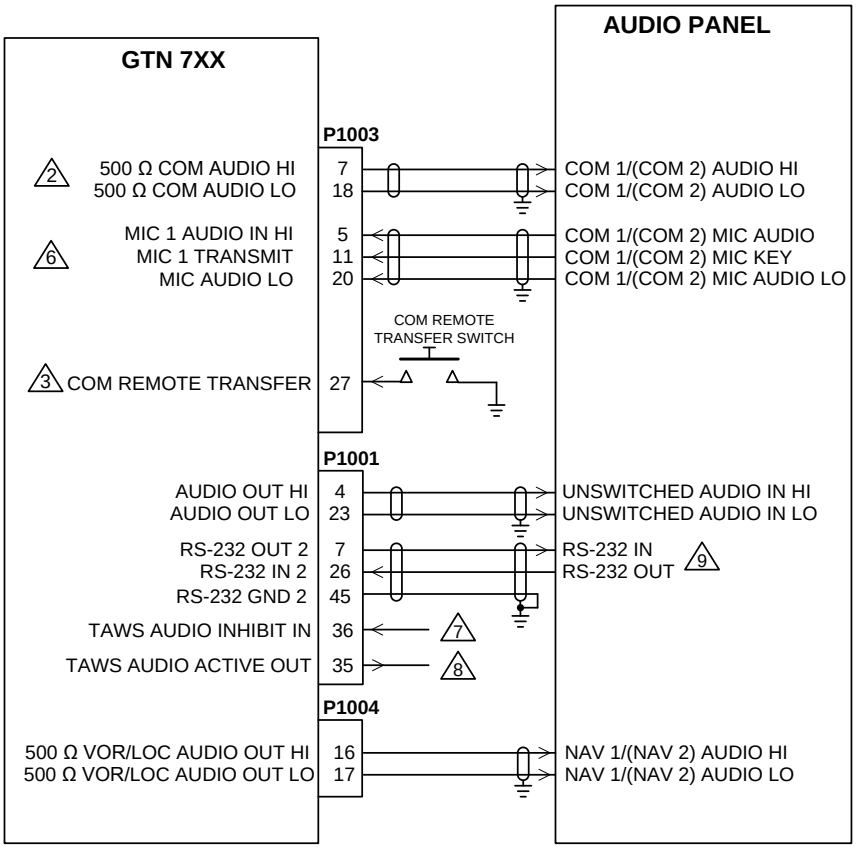
4. ANY ETHERNET PORT MAY BE USED IN LIEU OF ETHERNET PORT 3. IF THERE ARE NO FREE PORTS ON THE GTN 7XX, THE OTHER LRU CAN BE DISCONNECTED (EXCEPT GDU 620) FROM THE GTN 7XX AND THE GDL 69/69A CAN BE CONNECTED TO THE GTN 7XX IN ITS PLACE. THE DISCONNECTED LRU CAN BE CONNECTED TO ETHERNET PORT 2, 3, OR 4 ON THE GDL 69/69A. REFER TO SECTION 6.4 FOR HSDB ARCHITECTURE OPTIONS.

5. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THESE INCLUDE THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	392404 (24 AWG)

6. ETHERNET PORTS 2, 3, OR 4 MAY BE USED LIEU OF PORT 1. THE PORT THAT IS USED MUST BE ENABLED IN CONFIGURATION MODE. REFER TO THE GDL 69/69A INSTALLATION MANUAL FOR ADDITIONAL DETAILS.

Figure D-13. GTN - GDL 69/69A Interconnect

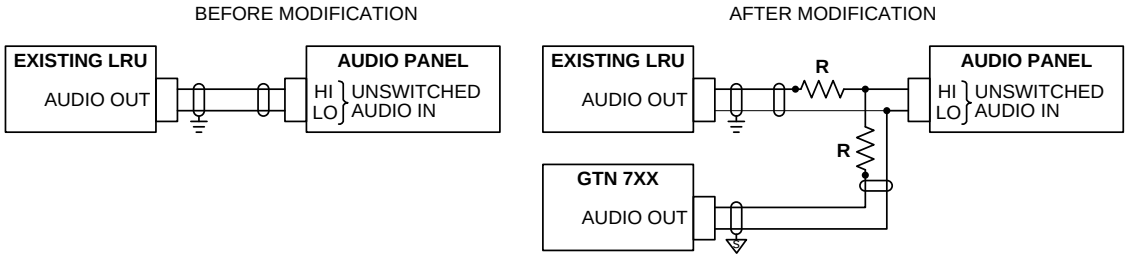


NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. THE 500 OHM AUDIO OUTPUTS ARE BALANCED OUTPUTS, AND THE LO OUTPUTS MUST BE CONNECTED. IF THE AUDIO PANEL DOES NOT HAVE A LO INPUT, THE LO OUTPUT SHOULD BE CONNECTED TO A GROUND LUG AT THE AUDIO PANEL.
3. THE COM REMOTE TRANSFER INPUT MAY BE USED FOR EMERGENCY OPERATION OF THE COM TRANSMITTER. IF THE REMOTE TRANSFER SWITCH IS ACTIVE FOR TWO SECONDS, THE ACTIVE COM FREQUENCY WILL CHANGE TO 121.50 MHZ.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END (WITH LEADS LESS THAN 3.0 INCHES) AND LEFT FLOATING AT THE OTHER END. IF SHIELDED AUDIO CABLE IS CARRIED THROUGH A DISCONNECT, CARRY THE SHIELD GROUND THROUGH THE DISCONNECT ON A SEPARATE PIN.
6. CONNECTING TWO MICROPHONES TO MIC AUDIO HI/LO AT THE SAME TIME MAY RESULT IN WEAK OR DISTORTED AUDIO. MIC ISOLATION RELAYS ARE RECOMMENDED SO THAT ONLY ONE MIC IS ACTIVE AT A TIME.
7. USE THE AUDIO INHIBIT IN DISCRETE INPUT TO INHIBIT GTN 7XX AURAL ALERTS WHEN A HIGHER PRIORITY SYSTEM IS PLAYING AUDIO MESSAGES.
8. USE THE AUDIO ACTIVE OUT DISCRETE OUTPUT TO INHIBIT AURAL ALERTS FROM LOWER PRIORITY SYSTEMS WHENEVER THE GTN 7XX IS PLAYING AUDIO MESSAGES.
9. GMA 35 ONLY.

Figure D-14. Audio Panel Interconnect
Sheet 1 of 2

MIXING AUDIO SIGNALS USING RESISTORS ⚠4



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END ONLY AND LEFT FLOATING AT THE OTHER END. IF SHIELDED AUDIO CABLE IS CARRIED THROUGH A DISCONNECT, CARRY THE SHIELD GROUND THROUGH THE DISCONNECT ON A SEPARATE PIN.

⚠4. IF AUDIO PANEL DOES NOT HAVE AN AVAILABLE UNSWITCHED INPUT, AUDIO FROM THE GTN 7XX MUST BE MIXED WITH AN EXISTING AUDIO SOURCE USING RESISTORS TO ISOLATE THE AUDIO OUTPUT FROM EACH LRU. A TYPICAL VALUE FOR MIXING RESISTORS IS 390Ω ¼ W. THE AUDIO LEVELS OF EXISTING AUDIO SOURCES WILL HAVE TO BE RE-EVALUATED AFTER MIXING RESISTORS ARE INSTALLED.

Figure D-14. Audio Panel Interconnect
Sheet 2 of 2

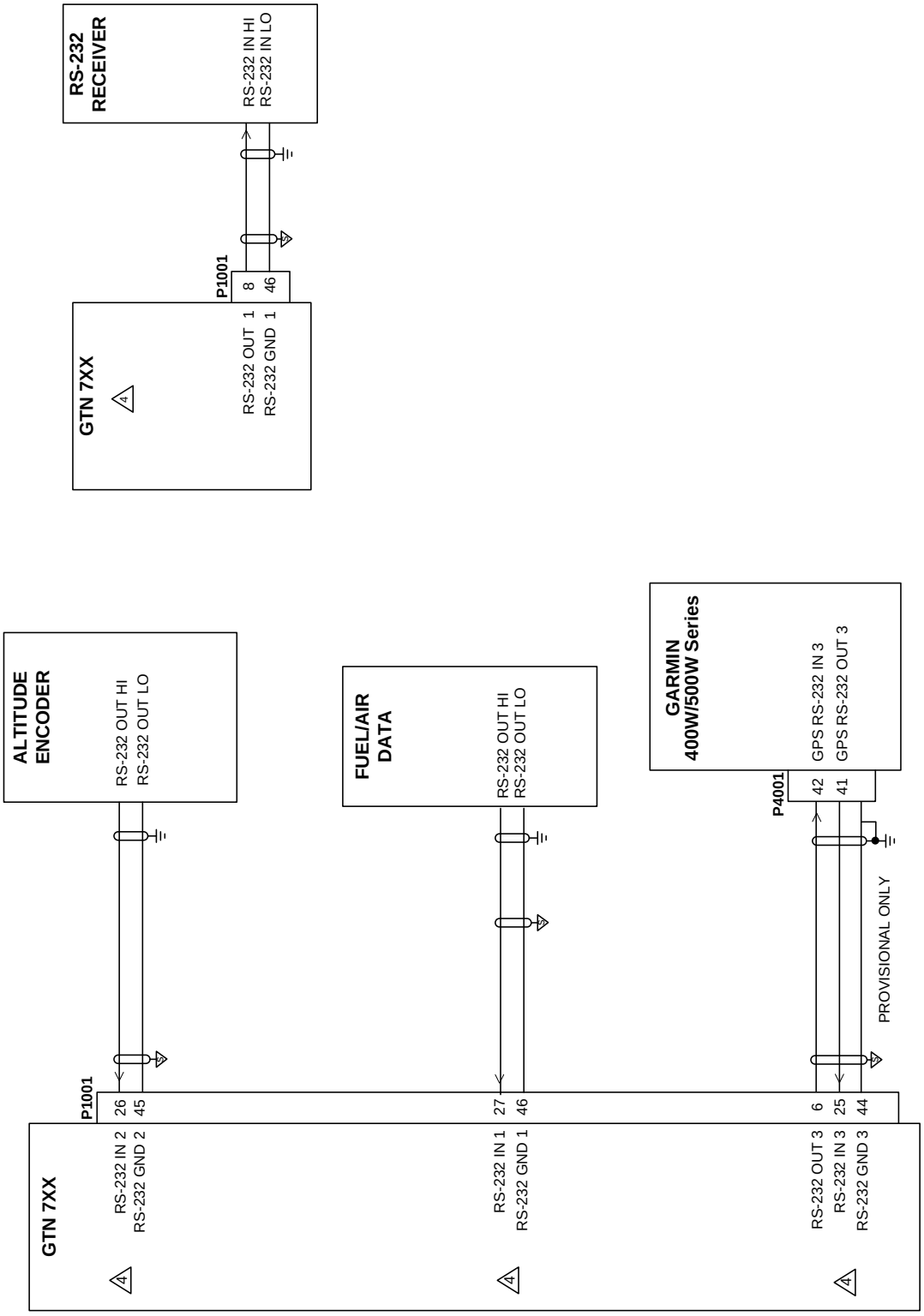
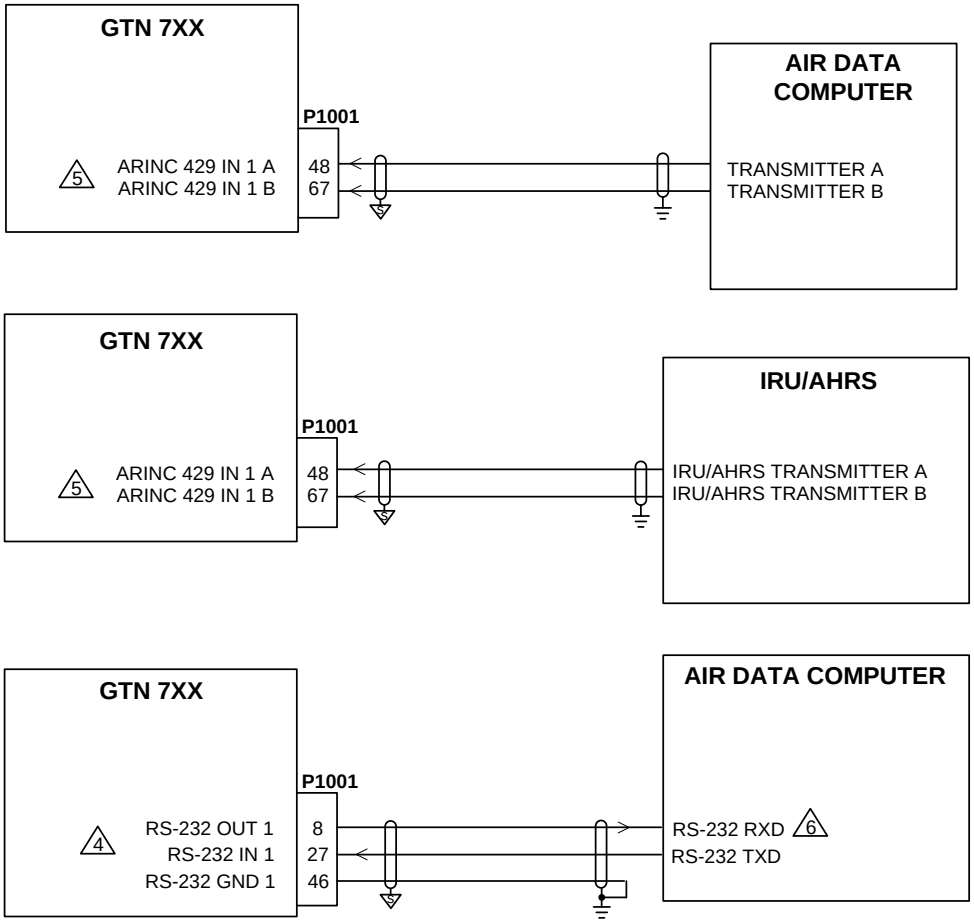


Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO SECTION 6 FOR RS-232 CHANNEL SETTINGS. RS-232 CHANNEL PORTS 1 TO 3 ARE SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
Sheet 2 of 2



NOTES:

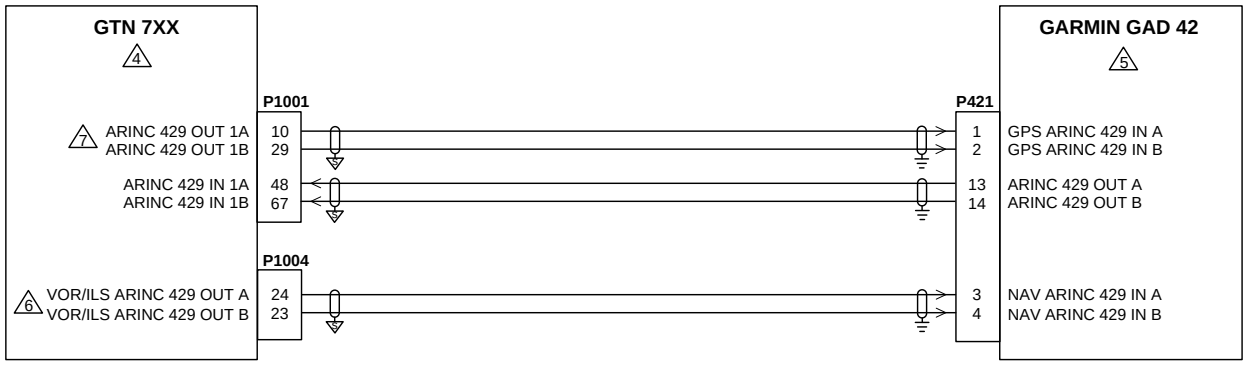
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

△4. REFER TO SECTION 6 FOR RS-232 CHANNEL SETTINGS. RS-232 CHANNEL 1 PORT IS SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED.

△5. REFER TO SECTION 6 FOR ARINC 429 CHANNEL SETTINGS. IF ARINC 429 IN 1 PORT IS BEING USED FOR ANOTHER PURPOSE, THE ARINC 429 IN 2 PORT (P1001 PINS -47 AND -66) MAY BE CONNECTED IN LIEU OF PORT 1.

△6. USED ONLY ON TAS 1000.

Figure D-16. Air Data/IRU/AHRS ARINC 429 Interconnect


GTN 7XX
4
P1001
7 ARINC 429 OUT 1A 10
ARINC 429 OUT 1B 29
ARINC 429 IN 1A 48
ARINC 429 IN 1B 67
P1004
6 VOR/ILS ARINC 429 OUT A 24
VOR/ILS ARINC 429 OUT B 23
P421
1 GPS ARINC 429 IN A
2 GPS ARINC 429 IN B
13 ARINC 429 OUT A
14 ARINC 429 OUT B
3 NAV ARINC 429 IN A
4 NAV ARINC 429 IN B
GARMIN GAD 42
5

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

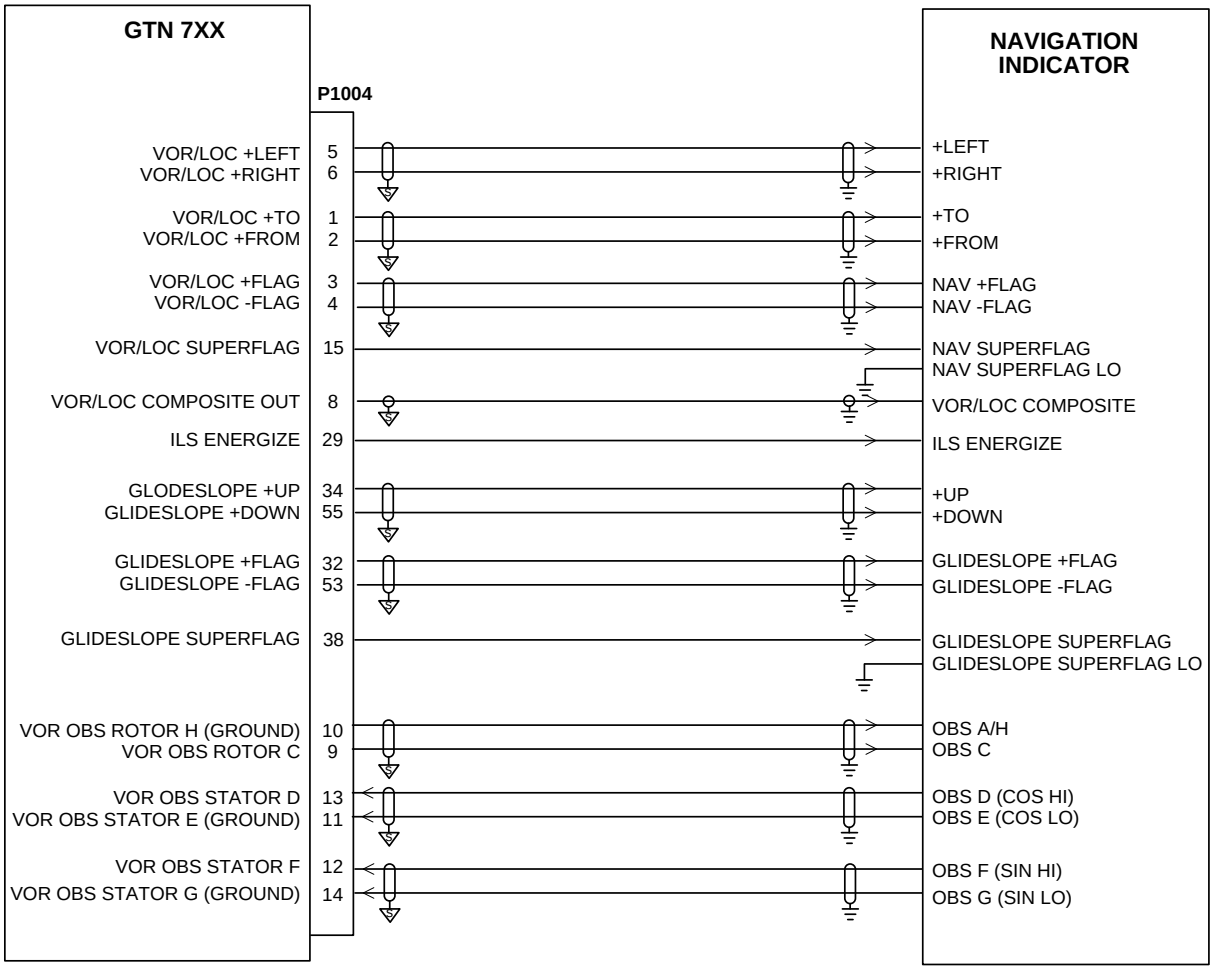
△4 FOR GTN 7XX CONFIGURATION SETTINGS, SEE SECTION 6.

△5 SEE GARMIN GAD 42 INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. CONFIGURE THE ARINC 429 BUS SPEED TO MATCH THE GTN 750 OUTPUT SPEED.

△6 THESE CONNECTIONS ARE ONLY USED ON THE GTN 750.

△7 IF THE ARINC 429 OUT 1 PORT (P1001 PINS -10 AND -29) IS ALREADY USED FOR ANOTHER PURPOSE, THE ARINC 429 OUT 2 PORT (P1001 PINS -9 AND -28) MAY BE CONNECTED IN LIEU OF PORT 1.

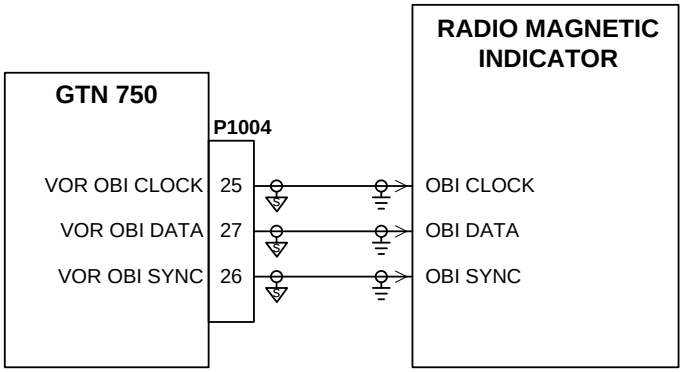
Figure D-17. GAD 42 Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
5. THIS INTERCONNECT APPLIES ONLY WHEN IT IS DESIRED FOR A SEPARATE INDICATOR TO DISPLAY GTN 750 VOR/ILS INFORMATION REGARDLESS OF THE CDI BUTTON STATUS.

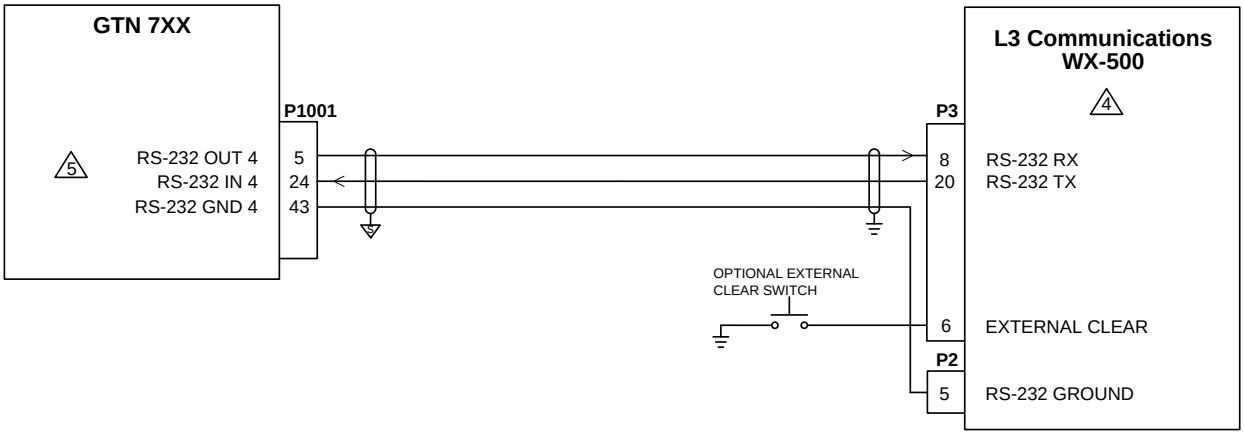
Figure D-18. VOR/ILS Indicator Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

Figure D-19. RMI OBI Interconnect



NOTES:

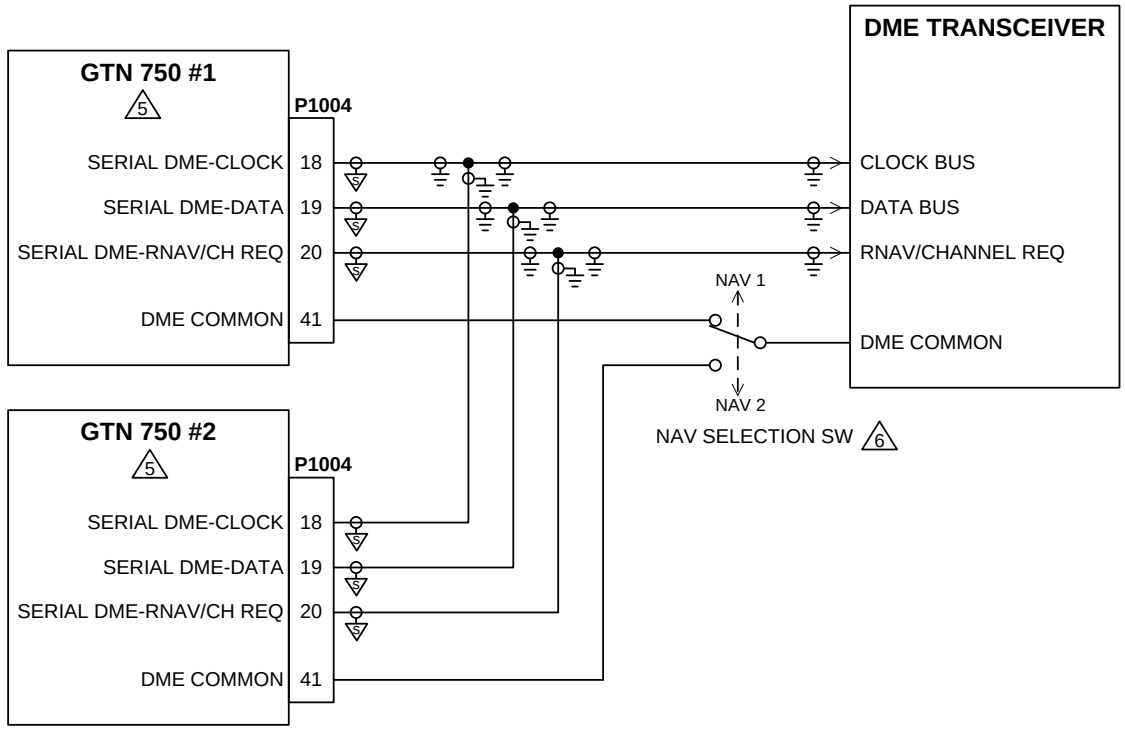
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. FOR WX-500 DATA TO BE DISPLAYED ON THE GTN 7XX MAP PAGE THE GTN 7XX MUST HAVE A DIGITAL HEADING SOURCE, OR THE WX-500 MUST HAVE A SYNCHRO OR SERIAL HEADING SOURCE. A STEPPER HEADING SOURCE WILL NOT ALLOW WX-500 DATA TO BE DISPLAYED ON THE MAP PAGE.

5. ANY AVAILABLE RS-232 PORT MAY BE USED. REFER TO SECTION 6 FOR RS-232 CHANNEL SETTINGS.

6. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D-20. GTN – WX-500 Interconnect



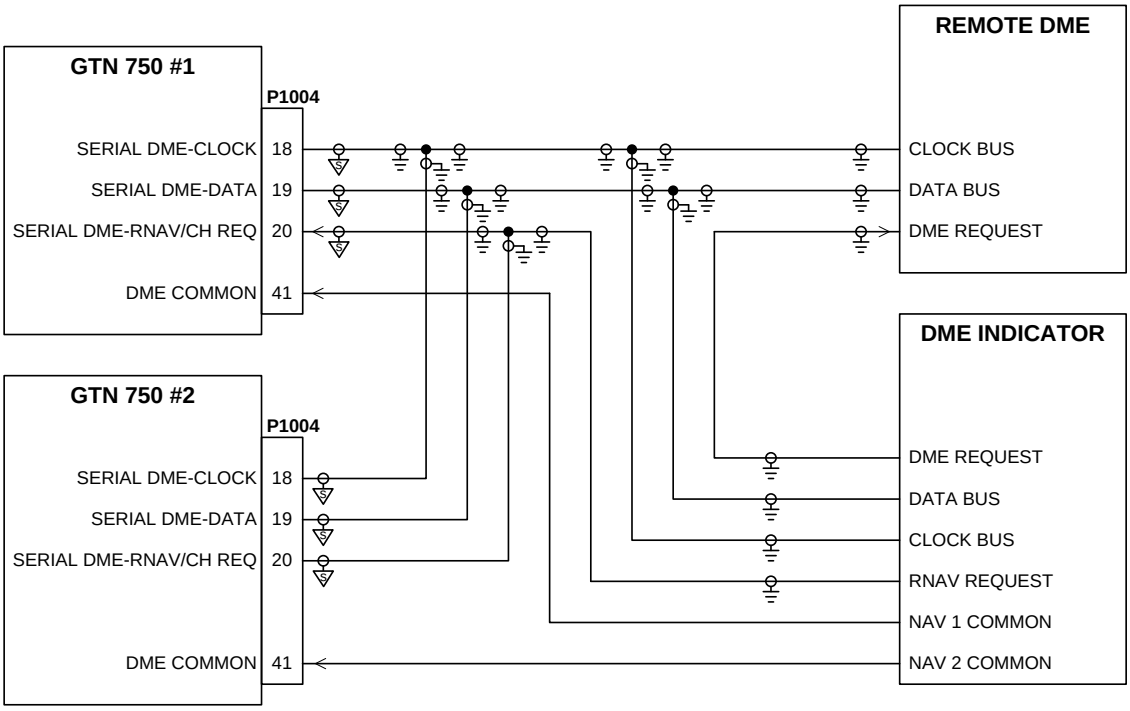
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 750, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

5. THE GTN 750 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT KING SERIAL DME TUNING DATA UNDER THE DME CHANNEL MODE.

6. THE NAV SELECTION SWITCH IS ONLY REQUIRED IF TWO GTN 750s ARE INSTALLED.

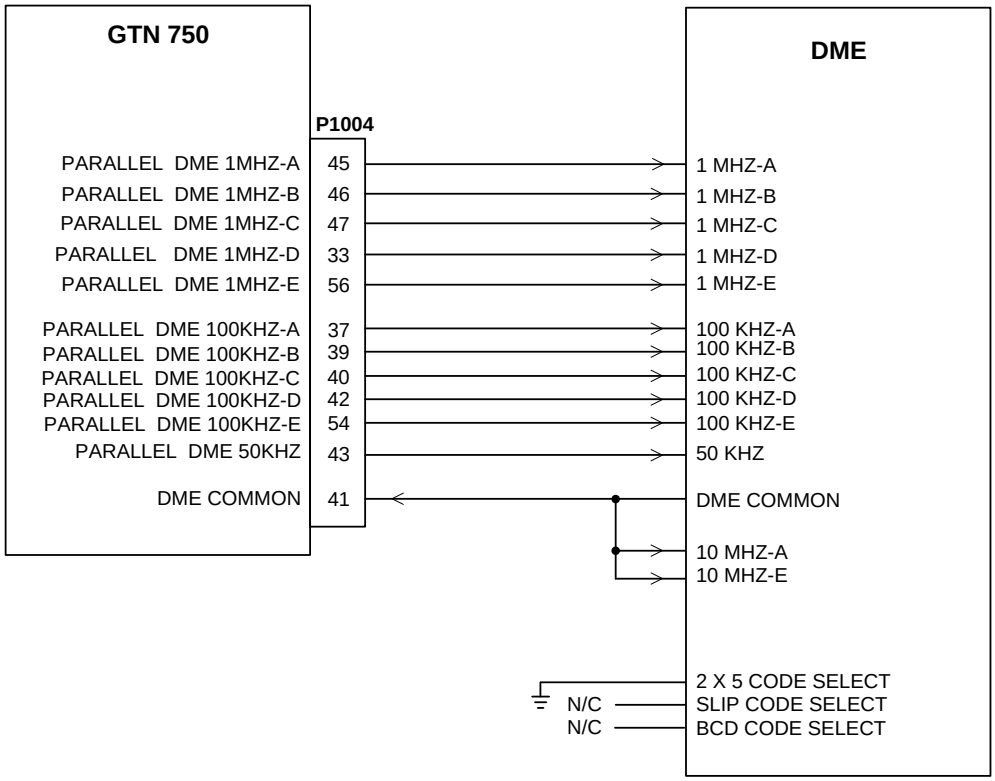
Figure D-21. GTN 750 - DME Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 750, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
5. THE GTN 750 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT DME TUNING DATA UNDER THE DME CHANNEL MODE.

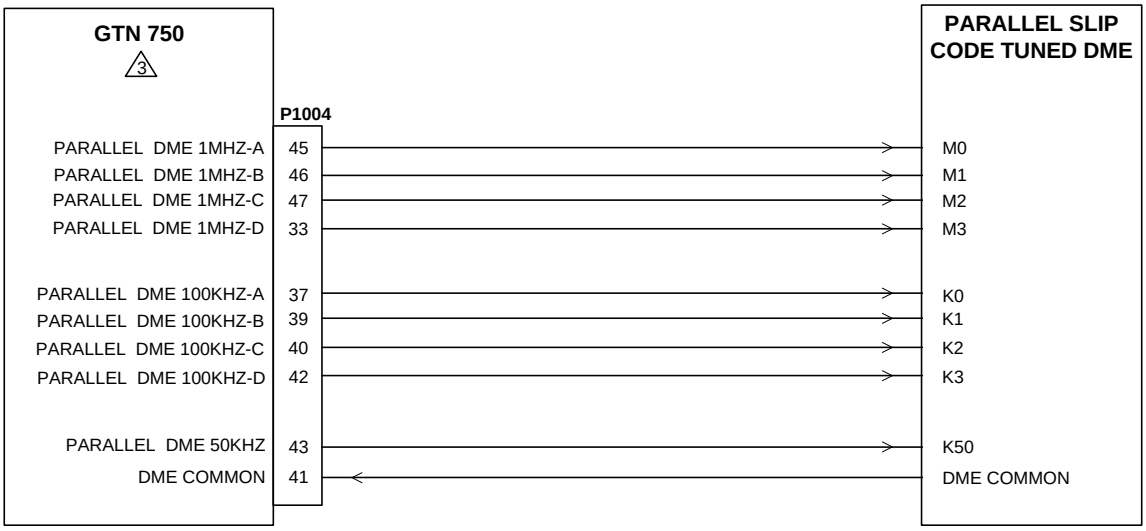
Figure D-22. GTN 750 – Remote DME Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 750, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT.

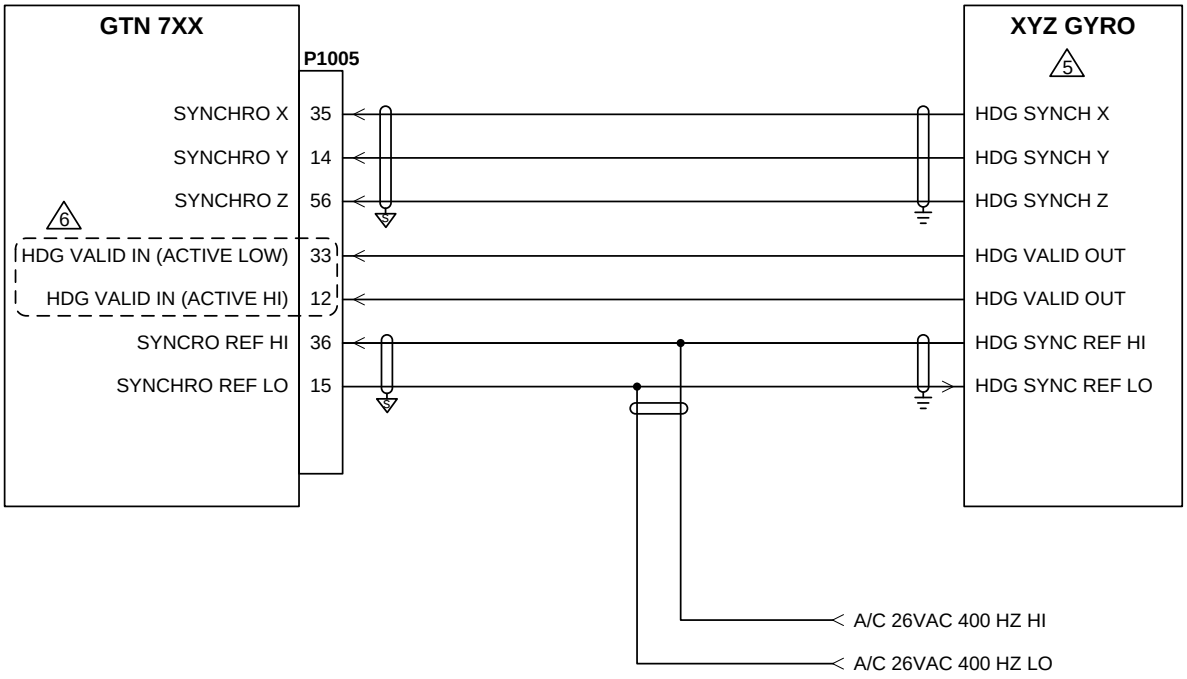
Figure D-23. Parallel 2 of 5 DME Tuning



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
3. THE GTN 750 MUST BE CONFIGURED TO OUTPUT SLIP CODE DME TUNING DATA FOR PROPER OPERATION IN THIS CONFIGURATION.

Figure D-24. Parallel Slip Code DME Tuning Interconnect



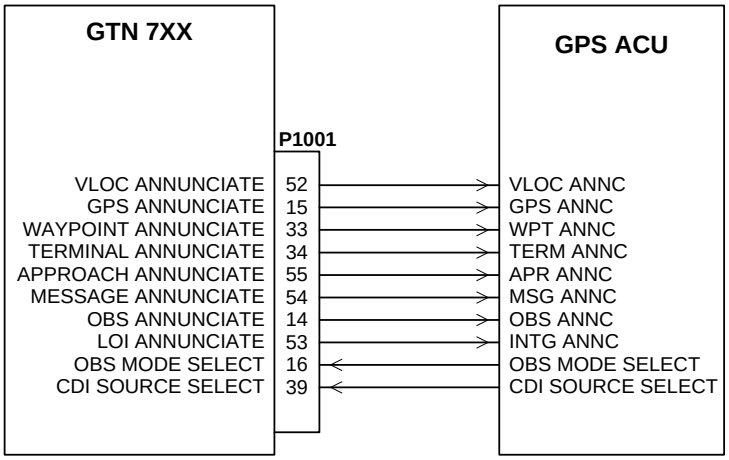
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

5. A DIRECTIONAL GYRO OR HSI BOOTSTRAP OUTPUT MAY BE USED TO PROVIDE SYNCHRO HEADING TO THE GTN 7XX.

6. **EITHER** THE HDG VALID IN (ACTIVE HI) **OR** HDG VALID IN (ACTIVE LO) SHOULD BE CONNECTED. DO NOT CONNECT BOTH OF THESE INPUTS TO THE SYNCHRO.

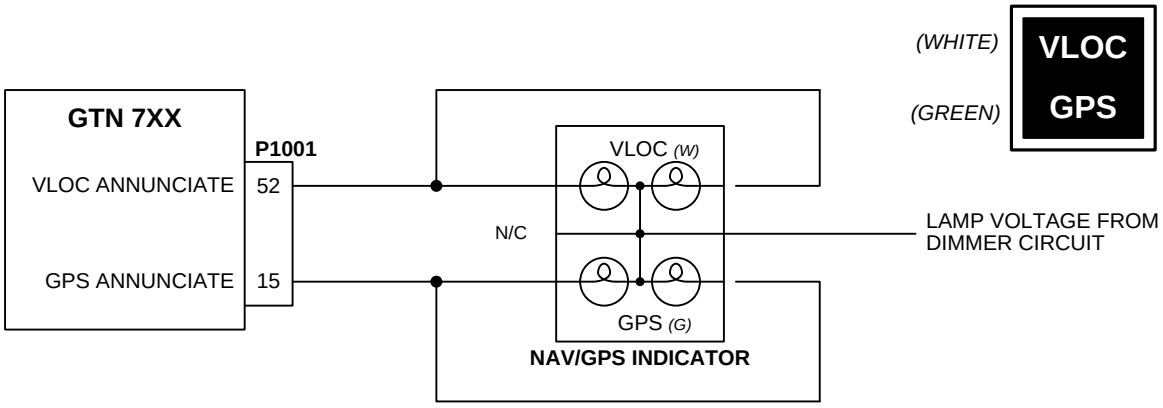
Figure D-25. Heading Synchro Interconnect


GTN 7XX
GPS ACU
P1001
VLOC ANNUNCIATE 52 VLOC ANNC
GPS ANNUNCIATE 15 GPS ANNC
WAYPOINT ANNUNCIATE 33 WPT ANNC
TERMINAL ANNUNCIATE 34 TERM ANNC
APPROACH ANNUNCIATE 55 APR ANNC
MESSAGE ANNUNCIATE 54 MSG ANNC
OBS ANNUNCIATE 14 OBS ANNC
LOI ANNUNCIATE 53 INTG ANNC
OBS MODE SELECT 16 OBS MODE SELECT
CDI SOURCE SELECT 39 CDI SOURCE SELECT

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. LEGENDS ARE HIDDEN (BLACK) WHEN NOT ILLUMINATED.

Figure D-26. GPS Annunciator Interconnect



NOTES:

1. THE PREFERRED ANNUNCIATION IS VLOC/GPS ALTHOUGH NAV/GPS IS ACCEPTABLE.

Figure D-27. NAV Source Select Annunciator Interconnect

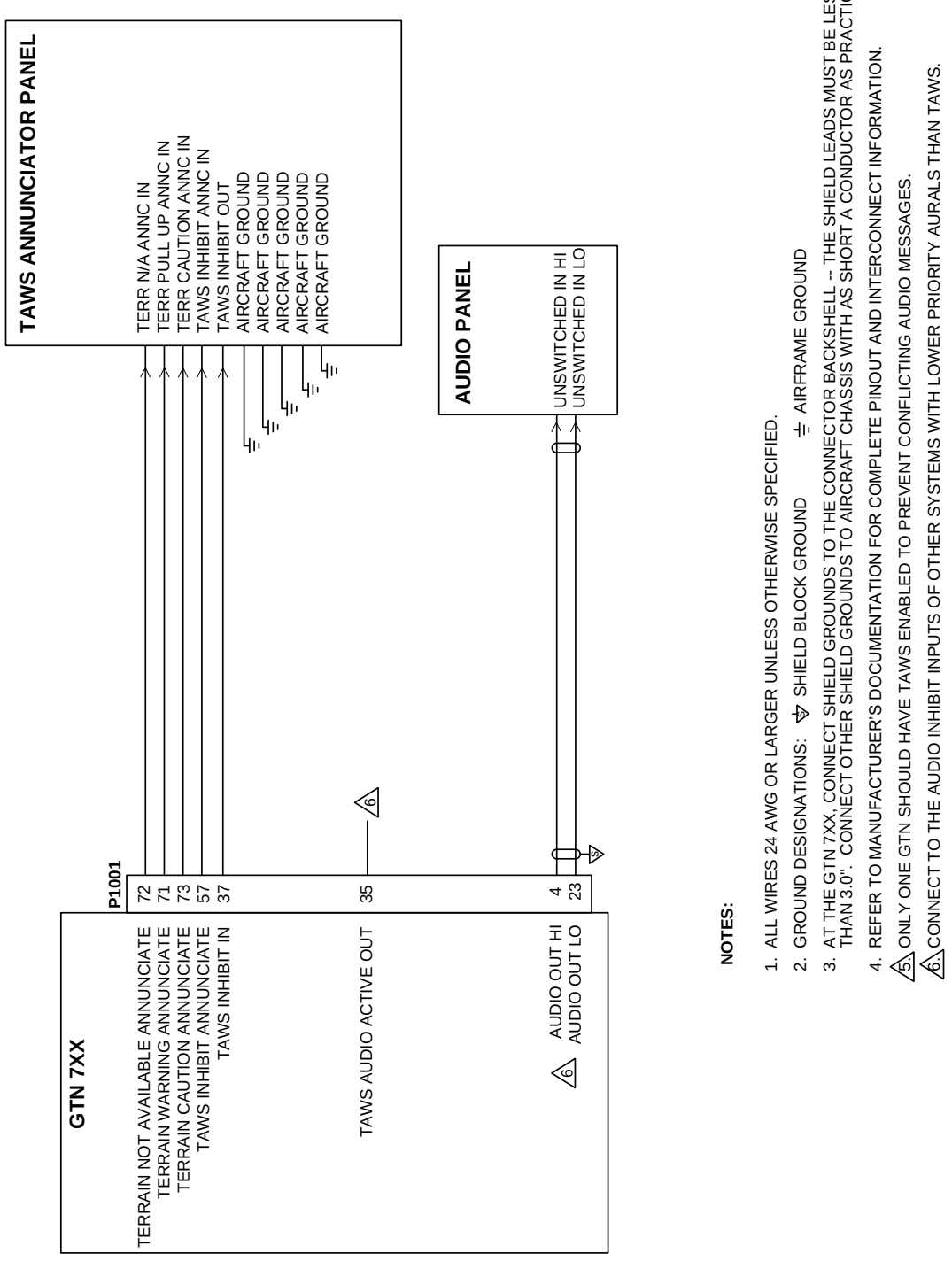
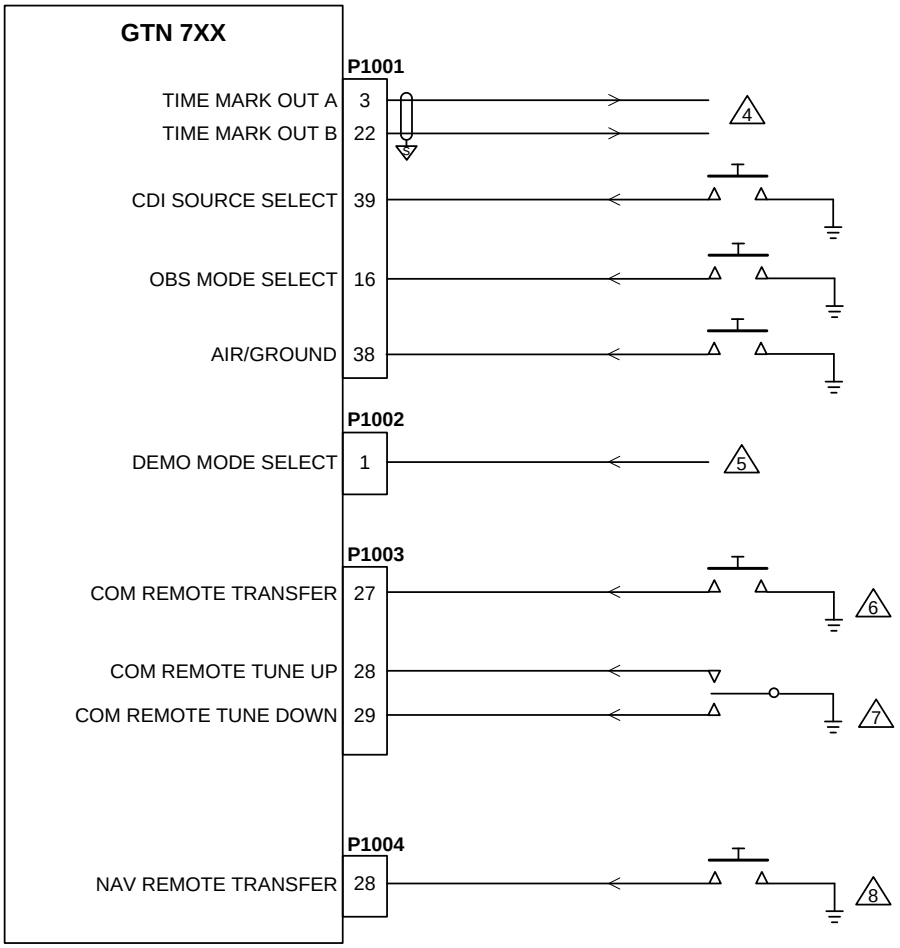

TAWS ANNUNCIATOR PANEL
TERR N/A ANNC IN
TERR PULL UP ANNC IN
TERR CAUTION ANNC IN
TAWS INHIBIT ANNC IN
TAWS INHIBIT OUT
AIRCRAFT GROUND
AIRCRAFT GROUND
AIRCRAFT GROUND
AIRCRAFT GROUND
AUDIO PANEL
UNSWITCHED IN HI
UNSWITCHED IN LO
P1001
72
71
73
57
37
35
4
23
6
GTN 7XX
TERRAIN NOT AVAILABLE ANNUNCIATE
TERRAIN WARNING ANNUNCIATE
TERRAIN CAUTION ANNUNCIATE
TAWS INHIBIT ANNUNCIATE
TAWS INHIBIT IN
TAWS AUDIO ACTIVE OUT
AUDIO OUT HI
AUDIO OUT LO
NOTES:
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
5. ONLY ONE GTN SHOULD HAVE TAWS ENABLED TO PREVENT CONFLICTING AUDIO MESSAGES.
6. CONNECT TO THE AUDIO INHIBIT INPUTS OF OTHER SYSTEMS WITH LOWER PRIORITY AURALS THAN TAWS.

Figure D-28. TAWS Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. TIME MARK OUT (P1001-3 & -22) OUTPUTS A DIFFERENTIAL 1 MILLISECOND WIDE PULSE ONCE PER SECOND.

5. DEMO MODE SELECT (P1002-1) MAY BE GROUNDED TO START THE UNIT IN DEMO MODE. DO NOT USE IN AN AIRCRAFT INSTALLATION.

6. COM REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY COM FREQUENCY TO THE ACTIVE COM FREQUENCY VIA REMOTE SWITCH.

7. COM REMOTE TUNE UP AND COM REMOTE TUNE DOWN MAY BE USED TO SCROLL THROUGH A LIST OF USER COM FREQUENCIES.

8. NAV REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY NAV FREQUENCY TO THE ACTIVE NAV FREQUENCY VIA REMOTE SWITCH.

9. SOME DISCRETE INPUTS AND OUTPUTS ARE CONFIGURABLE FOR OTHER FUNCTIONS. DEFAULTS ARE SHOWN.

Figure D-29. Switches Interconnect

GARMIN